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《Java 面向对象程序设计》第 3 版 -微课版-实验指导的模板代码

模板代码

目 录

上机实践 1　Java 入门

实验 1　一个简单的应用程序

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

Hello.java

```
public class Hello {
public static void main (String args[ ]) {
        【代码 1】      //命令行窗口输出"你好，很高兴学习 Java"
            A a=new A();
            a.fA();
    }
}
class A {
    void fA() {
        【代码 2】      //命令行窗口输出"We are students"
    }
}
```

实验 2　教室、老师和学生

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

ClassRoom.java

```
public class ClassRoom {
    public static void main (String args[ ]) {
        【代码 1】//命令行窗口输出"教学活动从教室开始"
        Teacher zhang = new Teacher();
        Student jiang = new Student();
        zhang.introduceSelf();
        jiang.introduceSelf();
    }
}
```

Teacher.java

```
public class Teacher {
   void introduceSelf() {
        【代码 2】       //命令行窗口输出"我是张老师"
    }
}
```

Student.java

```
public class Student {
   void introduceSelf() {
        【代码 3】//命令行窗口输出"我是学生,名字是:奖励"
    }
}
```

上机实践 2　基本数据类型

实验 1　输出特殊边傍的汉字

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

InputChinese.java

```
public class E {
    public static void main (String args[ ]){
        char ch='研',zifu=0;
        int p=22920,count=5,position=0;
        System.out.printf("输出%d 个石字傍的汉字:\n",count);
        for(char c=ch;c<=ch+count;c++) {
          【代码 1】    //c 进行 int 型转换据运算，并将结果赋值给 position
          System.out.printf("%c(%d)",c,position);
        }
        System.out.printf("\n 输出%d 个女字傍的汉字:\n",count);
        for(int n=p;n<=p+count;n++) {
          【代码 2】   // n 做 char 型转换运算，并将结果赋值给 zifu
          System.out.printf("%c(%d)",zifu,n);
        }
    }
}
```

实验 2　输入、输出学生的基本信息

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

InputMess.java

```
import java.util.Scanner;
public class InputMess {
    public static void main(String args[]) {
        Scanner reader=new Scanner(System.in);
        System.out.println("输入姓名(回车确认):");
        String name=【代码 1】 //从键盘为 name 赋值
        System.out.println("输入年龄(回车确认):");
        byte age=【代码 2】 //从键盘为 age 赋值
        System.out.println("输入身高(回车确认):");
```

```
        float height=【代码 3】  //从键盘为 height 赋值
        System.out.printf("%28s\n","--基本信息--");
        System.out.printf("%10s%-10s","姓名:",name);
        System.out.printf("%4s%-4d","年龄:",age);
        System.out.printf("%4s%-4.2f","身高:",height);
    }
}
```

实验 3　超大整数的加法

程序模板　仔细阅读模板代码，完成实验后的练习。

HandleLargeNumber.java

```
public class HandleLargeNumber {
    public static void main(String args[]) {
        int a[] = {0,9,9,7,9,4,5,6,7,2,3,4,5,6,4,7,8,9,8,7,6,9};
        int b[] = {0,0,5,9,1,6,4,5,6,2,3,4,5,7,2,1,3,4,0,3,2,9};
        int c[]= new int[a.length];
        int i = 0,result =0,k=0;
        for(i=0;i<a.length;i++) {
            if(a[i]!=0) {
                k=i;
                break;
            }
        }
        for(i=k;i<a.length;i++) {
             System.out.printf("%d",a[i]);
        }
        System.out.printf("\n 加上:\n");
        for(i=0;i<b.length;i++) {
            if(b[i]!=0) {
                k=i;
                break;
            }
        }
        for(i=k;i<b.length;i++) {
             System.out.printf("%d",b[i]);
        }
        for(i=a.length-1;i>=0;i--) {
            result = a[i]+b[i];
            if(result>=10) {
                    c[i] = result%10;
```

```
                    a[i-1] = a[i-1]+1;
                }
                else
                    c[i] = result;
            }
            System.out.printf("\n 等于:\n");
            for(i=0;i<c.length;i++) {
                if(c[i]!=0) {
                    k=i;
                    break;
                }
            }
            for(i=k;i<c.length;i++) {
                System.out.printf("%d",c[i]);
            }
        }
    }
```

上机实践 3　运算符、表达式与语句

实验 1　托运行李

程序模板　请按模板要求，将【代码】替换为程序代码。

BaggageAndMony.java

```
import java.util.Scanner;
public class BaggageAndMony {
    public static void main(String args[]) {
        int trainCharge=12; //火车托运计费:每公斤 12 元
        int carCharge=22;     //汽车托运计费:每公斤 12 元
        double planeCharge = 0.062 ;//飞机托运计费:每克 0.062 元
        Scanner reader=new Scanner(System.in);
        double weight,charge;
        System.out.printf("输入行李重量:");
        weight = reader.nextDouble();
        System.out.printf("行李重量:%f 公斤(kg)\n",weight);
        System.out.printf("需要计费的重量:%d(kg)\n",(int)weight);
        【代码 1】  //将表达式(int)weight*trainCharge 的值赋值给 charge
        System.out.printf("用火车托运(%d 元/kg),费用:%f 元\n",trainCharge,charge);
        System.out.printf("需要计费的重量:%d(kg)\n",(int)(weight+0.5));
        【代码 2】//将表达式(int)(weight+0.5)*carCharge 的值赋值给 charge
        System.out.printf("用汽车托运(%d 元/kg),费用:%f 元\n",carCharge,charge);
        System.out.printf("行李重量:%f 克(g)\n",weight*1000);
        System.out.printf("需要计费的重量:%d(g)\n",(int)(weight*1000+0.5));
        【代码 3】//将表达式(int)(weight*1000+0.5)*planeCharge 的值赋值给 charge
        System.out.printf("用飞机托运(%f 元/g),费用:%f 元\n", planeCharge,charge);
    }
}
```

实验 2　自动售货机

程序模板　请编译、运行模板给出的代码，然后完成试验后的练习。

MachineSell.java

```
import java.util.Scanner;
public class MachineSell {
    public static void main(String args[]){
```

```
        int money;
        int drinkKind;
        System.out.printf("投入金额:2 或 3 元(回车确认):");
        Scanner reader=new Scanner(System.in);
        money=reader.nextInt();
        if(money==2) {
            System.out.printf("选择净净矿泉水(1),甜甜矿泉水(2)和美美矿泉水(3)之一:\n");
            System.out.printf("输入 1,2 或 3:");
            drinkKind=reader.nextInt();
            switch(drinkKind) {
                case 1 : System.out.printf("得到净净矿泉水\n");
                         break;
                case 2 : System.out.printf("得到甜甜矿泉水\n");
                         break;
                case 3 : System.out.printf("得到美美矿泉水\n");
                         break;
                default: System.out.printf("选择错误");
            }
        }
        else if(money==3) {
            System.out.printf("选择爽口可乐(1),清凉雪碧(2),和雪山果汁(3)之一:\n");
            System.out.printf("输入 1,2 或 3:");
            drinkKind=reader.nextInt();
            switch(drinkKind) {
                case 1 : System.out.printf("得到爽口可乐\n");
                         break;
                case 2 : System.out.printf("得到清凉雪碧\n");
                         break;
                case 3 : System.out.printf("得到雪山果汁\n");
                         break;
                default: System.out.printf("选择错误");
            }
        }
        else {
            System.out.printf("输入的钱币不符合要求");
        }
    }
}
```

实验 3　猜数字游戏

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

GuessNumber.java

```
import java.util.Scanner;
import java.util.Random;
public class GuessNumber {
    public static void main (String args[]) {
        Scanner reader = new Scanner(System.in);
        Random random = new Random();
        System.out.println("给你一个 1 至 100 之间的整数,请猜测这个数");
        int realNumber = random.nextInt(100)+1; //random.nextInt(100)是[0,100)中的随机整数
        int yourGuess = 0;
        System.out.print("输入您的猜测:");
        yourGuess = reader.nextInt();
        while(【代码 1】) //循环条件
        {
            if(【代码 2】)    //猜大了的条件代码
            {
                System.out.print("猜大了,再输入你的猜测:");
                yourGuess = reader.nextInt();
            }
            else if(【代码 3】) //猜小了的条件代码
            {
                System.out.print("猜小了,再输入你的猜测:");
                yourGuess = reader.nextInt();
            }
        }
        System.out.println("猜对了!");
    }
}
```

上机实践 4　类与对象

实验 1　Tank 类

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

Tank. java

```
public class Tank {
    【代码 1】//声明 double 型变量 speed,刻画速度
    【代码 2】//声明 int 型变量 bulletAmount,刻画炮弹数量
     void speedUp(int s) {
          【代码 3】     //将 s+speed 赋值给 speed
     }
     void speedDown(int d) {
         if(speed-d>=0)
            【代码 4】   //将 speed-d 赋值给 speed
         else
            speed = 0;
     }
     void setBulletAmount(int m) {
         bulletAmount = m;
     }
     int getBulletAmount() {
         return bulletAmount;
     }
     double getSpeed() {
         return speed;
     }
     void fire() {
          if(bulletAmount>=1){
              【代码 5】   //将 bulletAmount-1 赋值给 bulletAmount
              System.out.println("打出一发炮弹");
          }
          else {
              System.out.println("没有炮弹了,无法开火");
          }
     }
}
```

Fight.java

```
public class Fight {
    public static void main(String args[]) {
        Tank tank1,tank2;
        tank1 = new Tank();
        tank2 = new Tank();
        tank1.setBulletAmount(10);
        tank2.setBulletAmount(10);
        System.out.println("tank1 的炮弹数量："+tank1.getBulletAmount());
        System.out.println("tank2 的炮弹数量："+tank2.getBulletAmount());
        tank1.speedUp(80);
        tank2.speedUp(90);
        System.out.println("tank1 目前的速度："+tank1.getSpeed());
        System.out.println("tank2 目前的速度："+tank2.getSpeed());
        tank1.speedDown(15);
        tank2.speedDown(30);
        System.out.println("tank1 目前的速度："+tank1.getSpeed());
        System.out.println("tank2 目前的速度："+tank2.getSpeed());
        System.out.println("tank1 开火：");
        tank1.fire();
        System.out.println("tank2 开火：");
        tank2.fire();
        tank2.fire();
        System.out.println("tank1 的炮弹数量："+tank1.getBulletAmount());
        System.out.println("tank2 的炮弹数量："+tank2.getBulletAmount());
    }
}
```

实验 2　计算机与光盘

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

CD.java

```
public class CD {
    int size;
    int content[];
    public void setSize(int size) {
        this.size = size;
        content = new int[size];
    }
    public int getSize() {
        return size;
    }
```

```
    public int [] getContent() {
        return content;
    }
    public void setContent(int [] b) {
        int min=Math.min(content.length,b.length);
        for(int i=0;i<min;i++)
            content[i] = b[i];
    }
}
```

Computer.java

```
public class Computer {
    int data[];
    CD includeCD;
    public void putCD(CD cd) {
        includeCD = cd;
        int size=includeCD.getSize();
        data=new    int[size];
    }
    void copyToComputer() {
        int [] b = includeCD.getContent();
        int min=Math.min(data.length,b.length);
        for(int i=0;i<min;i++) {
            data[i] = b[i];
        }
    }
    public void addData(int m) {
        for(int i=0;i<data.length;i++) {
           data[i] = data[i]+m;
        }
    }
    void copyToCD() {
        includeCD.setContent(data);
    }
    void showData() {
        for(int i=0;i<data.length;i++) {
            System.out.printf("%3d",data[i]);
        }
    }
}
```

User.java

```
public class User {
```

```
    public static void main(String args[]) {
        CD dataCD = new CD();
        int b[] ={1,2,3,4,5,6,7,8};
        dataCD.setSize(b.length);
        dataCD.setContent(b);
        int a[]=dataCD.getContent();
        System.out.println("dataCD 上的内容：");
        for(int i=0;i<a.length;i++)
            System.out.printf("%3d",a[i]);
        Computer computerIMB = new Computer();
        【代码 1】//computerIMB 调用 putCD(CD cd)方法,将 dataCD 的引用传递给 cd
        System.out.println("\n 将 dataCD 的数据复制到计算机:computerIMB.");
      【代码 2】//computerIMB 调用 copyToComputer()方法
        System.out.println("computerIMB 上的内容：");
        computerIMB.showData();
        int m=12;
        System.out.println("\ncomputerIMB 将每个数据增加"+m);
        computerIMB.addData(m);
        System.out.println("computerIMB 将增值后的数据复制到 CD:dataCD");
        【代码 3】//computerIMB 调用 copyToCD()方法
        System.out.println("dataCD 上的内容：");
        a=dataCD.getContent();
        for(int i=0;i<a.length;i++)
            System.out.printf("%3d",a[i]);
    }
}
```

实验 3　家族的姓氏

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

FamilyPerson.java

```
public class FamilyPerson {
    static String surname;
    String name;
    public static void setSurname(String s){
        surname = s;
    }
    public void setName(String s) {
       name = s;
    }
}
```

MainClass.java

```
public class MainClass {
    public static void main(String args[]) {
        【代码 1】 //用类名 FamilyPerson 访问 surname,并为 surname 赋值:"李"
        FamilyPerson father,sonOne,sonTwo;
        father = new    FamilyPerson();
        sonOne = new    FamilyPerson();
        sonTwo = new    FamilyPerson();
        【代码 2】 //father 调用 setName(String s),并向 s 传递"向阳"
        sonOne.setName("抗日");
        sonTwo.setName("抗战");
        System.out.println("父亲:"+father.surname+father.name);
        System.out.println("大儿子:"+sonOne.surname+sonOne.name);
        System.out.println("二儿子:"+sonTwo.surname+sonTwo.name);
        【代码 3】// father 调用 setSurName(String s),并向 s 传递"张"
        System.out.println("父亲:"+father.surname+father.name);
        System.out.println("大儿子:"+sonOne.surname+sonOne.name);
        System.out.println("二儿子:"+sonTwo.surname+sonTwo.name);
    }
}
```

上机实践 5　继承与接口

实验 1　中国人与美国人

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

People.java

```
public class People {
    protected double weight,height;
    public void speakHello() {
        System.out.println("yayayaya");
    }
    public void averageHeight() {
         height=173;
         System.out.println("average height:"+height);
    }
    public void averageWeight() {
        weight=70;
        System.out.println("average weight:"+weight);
    }
}
```

ChinaPeople.java

```
public class ChinaPeople extends People {
        public void speakHello() {
            System.out.println("您好");
        }
        public void averageHeight() {
            height = 168.78;
            System.out.println("中国人的平均身高:"+height+" 厘米");
        }
    【代码 1】 //重写 public void averageWeight()方法，输出:"中国人的平均体重:65 公斤"
        public void chinaGongfu() {
            System.out.println("坐如钟,站如松,睡如弓");
        }
}
```

AmericanPeople.java

```
public class AmericanPeople extends People {
```

```
    【代码 2】 //重写 public void speakHello()方法，输出"How do you do"
    【代码 3】 //重写 public void averageHeight()方法，输出"American's average height:176 cm"
        public void averageWeight() {
            weight = 75;
            System.out.println("American's average weight:"+weight+" kg");
        }
        public void americanBoxing() {
            System.out.println("直拳、钩拳、组合拳");
        }
}
```

BeijingPeople.java

```
public class BeijingPeople extends ChinaPeople {
    【代码 4】 //重写 public void averageHeight()方法, 输出:"北京人的平均身高:172.5 厘米"
    【代码 5】 //重写 public void averageWeight()方法,输出:"北京人的平均体重:70 公斤"
    public void beijingOpera() {
        System.out.println("花脸、青衣、花旦和老生");
    }
}
```

Example.java

```
public class Example {
    public static void main(String args[]) {
        ChinaPeople chinaPeople=new ChinaPeople();
        AmericanPeople americanPeople=new AmericanPeople();
        BeijingPeople beijingPeople=new BeijingPeople();
        chinaPeople.speakHello();
        americanPeople.speakHello();
        beijingPeople.speakHello();
        chinaPeople.averageHeight();
        americanPeople.averageHeight();
        beijingPeople.averageHeight();
        chinaPeople.averageWeight();
        americanPeople.averageWeight();
        beijingPeople.averageWeight();
        chinaPeople.chinaGongfu();
        americanPeople.americanBoxing();
        beijingPeople.beijingOpera() ;
        beijingPeople.chinaGongfu();
    }
}
```

实验 2　银行与利息

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

Bank. java

```
public class Bank {
    int savedMoney;
    int year;
    double interest;
    double interestRate = 0.29;
    public double computerInterest() {
        interest=year*interestRate*savedMoney;
        return interest;
    }
    public void setInterestRate(double rate) {
        interestRate = rate;
    }
}
```

ConstructionBank.java

```
public class ConstructionBank extends Bank {
    double year;
    public double computerInterest() {
        super.year=(int)year;
        double r = year-(int)year;
        int day=(int)(r*1000);
        double yearInterest = 【代码 1】 //super 调用隐藏的 computerInterest()方法
        double dayInterest = day*0.0001*savedMoney;
        interest= yearInterest+dayInterest;
        System.out.printf("%d 元存在建设银行%d 年零%d 天的利息:%f 元\n",
                                savedMoney,super.year,day,interest);
        return interest;
    }
}
```

BankOfDalian.java

```
public class BankOfDalian extends Bank {
    double year;
    public double computerInterest() {
        super.year=(int)year;
        double r = year-(int)year;
        int day=(int)(r*1000);
```

```
            double yearInterest =  【代码 2】// super 调用隐藏的 computerInterest()方法
            double dayInterest = day*0.00012*savedMoney;
            interest= yearInterest+dayInterest;
            System.out.printf("%d 元存在大连银行%d 年零%d 天的利息:%f 元\n",
                                    savedMoney,super.year,day,interest);
            return interest;
        }
    }
```

SaveMoney.java

```
    public class SaveMoney {
        public static void main(String args[]) {
            int amount=8000;
            ConstructionBank bank1 = new ConstructionBank();
            bank1.savedMoney = amount;
            bank1.year = 8.236;
            bank1.setInterestRate(0.035);
            double interest1 = bank1.computerInterest();
            BankOfDalian bank2 = new BankOfDalian();
            bank2.savedMoney = amount;
            bank2.year = 8.236;
            bank2.setInterestRate(0.035);
            double interest2=bank2.computerInterest();
            System.out.printf("两个银行利息相差%f 元\n",interest2-interest1);
        }
    }
```

实验 3　面积之和

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

Geometry.java

```
    public abstract class Geometry   {
        public abstract double getArea();
    }
```

TotalArea.java

```
    public class TotalArea {
        Geometry[] tuxing;
        double totalArea=0;
        public void setTuxing(Geometry[] t) {
            tuxing=t;
```

```
    }
    public double computerTotalArea() {
        【代码 3】//用循环语句让 tuxing 的元素调用 getArea 方法，并将返回的值累加到 totalArea
        return totalArea;
    }
}
```

Rect.java

```
public class Rect extends Geometry {
    double a,b;
    Rect(double a,double b) {
        this.a = a;
        this.b = b;
    }
    【代码 1】 //重写 getArea()方法
}
```

Circle.java

```
public class Circle extends Geometry {
    double r;
    Circle(double r) {
        this.r = r;
    }
    【代码 2】 //重写 getArea()方法
}
```

MainClass.java

```
public class MainClass{
    public static void main(String args[]) {
        Geometry [] tuxing=new Geometry[29]; //有 29 个 Geometry 对象
        for(int i=0;i<tuxing.length;i++) {     //29 个 Geometry 对象分成两类
            if(i%2==0)
                tuxing[i]=new Rect(16+i,68);
            else if(i%2==1)
                tuxing[i]=new Circle(10+i);
        }
        TotalArea computer=new TotalArea();
        computer.setTuxing(tuxing);
        System.out.printf("各种图形的面积之和:\n%f",computer.computerTotalArea());
    }
```

```
}
```

实验 4　歌手大赛

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

CompurerAverage.java

```
public interface CompurerAverage {    //接口
    public double average(double x[]);
}
```

SongGame.java

```
public class SongGame implements CompurerAverage {
    public double average(double x[]) {
        int count=x.length;
        double aver=0,temp=0;
        for(int i=0;i<count;i++) {
            for(int j=i;j<count;j++) {
                if(x[j]<x[i]) {
                   temp=x[j];
                   x[j]=x[i];
                   x[i]=temp;
                }
            }
        }
        for(int i=1;i<count-1;i++) {
            aver=aver+x[i];
        }
        if(count>2)
            aver=aver/(count-2);
        else
            aver=0;
        return aver;
    }
}
```

School.java

```
public class School implements CompurerAverage {
    【代码 1】//重写 public double average(double x[])方法,返回数组 x[]的元素的算术平均
}
```

Estimator.java

```
public class Estimator{       //主类
    public static void main(String args[]) {
        double a[] = {9.89,9.88,9.99,9.12,9.69,9.76,8.97};
        double b[] ={56,55.5,65,50,51.5,53.6,70,49,66,62,46};
        CompurerAverage computer;
        computer=new SongGame();
        double result=【代码 2】 //computer 调用 average(double x[])方法，将数组 a 传递给参数 x
        System.out.printf("%n");
        System.out.printf("歌手最后得分:%5.3f\n",result);
        computer=new School();
        result=【代码 3】 //computer 调用 average(double x[])方法，将数组 b 传递给参数 x
        System.out.printf("学生平均体重:%-5.2f kg",result);
    }
}
```

实验 5　天气预报

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

WeatherState.java

```
public interface WeatherState {     //接口
      public void showState();
}
```

Weather.java

```
public class Weather {
    WeatherState    state;
    public void show() {
        state.showState();
    }
    public void setState(WeatherState s) {
        state = s;
    }
}
```

WeatherForecast.java

```
public class WeatherForecast {   //主类
    public static void main(String args[]) {
        Weather weatherBeijing =new Weather();
        System.out.print("\n 今天白天:");
        weatherBeijing.setState(new CloudyDayState());
```

```
            weatherBeijing.show();
            System.out.print("\n 今天夜间:");
            weatherBeijing.setState(new LightRainState());
            weatherBeijing.show();
            System.out.print("转:");
            weatherBeijing.setState(new HeavyRainState());
            weatherBeijing.show();
            System.out.print("\n 明天白天:");
            weatherBeijing.setState(new LightRainState());
            weatherBeijing.show();
            System.out.print("\n 明天夜间:");
            weatherBeijing.setState(new CloudyLittleState());
            weatherBeijing.show();
        }
    }
```

CloudyLittleState.java

```
    public class CloudyLittleState implements WeatherState {
        public void showState() {
            System.out.print("少云,有时晴.");
        }
    }
```

CloudyDayState.java

```
    public class CloudyDayState implements WeatherState {
        【代码 1】 //重写 public void showState()
    }
```

HeavyRainState.java

```
    public class HeavyRainState implements WeatherState{
        【代码 2】 //重写 public void showState()
    }
```

LightRainState.java

```
    public class LightRainState implements WeatherState {
        【代码 3】 //重写 public void showState()方法
    }
```

上机实践 6　内部类与异常类

实验 1　校内报纸

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

//RedCowForm.java

```
public class School {
    String schoolName;
    【代码 1】 //内部类声明对象 newsPaper
    School() {
        this("某某大学"); //调用带参数的构造方法
    }
    School(String s) {
        【代码 2】//创建对象 newsPaper
        String [] content = {"学校举办迎新会.", "机械系获得机器人大赛冠军.",
                             "计算机学院召开学生会换届大会."};
        schoolName = s;
        newsPaper.setContent(content);
    }
    public void showNews(){
        newsPaper.showContent();
    }
    class InnerNewsPaper {
        String [] content;
        String paperName = "校新闻周报";
        void setContent(String []s){
            content = s;
        }
        public void showContent(){
            System.out.println(schoolName);
            for(int i=0;i<content.length;i++){
                System.out.println(content[i]);
            }
        }
    }
}
```

//MainClass.java

```
public class MainClass {
```

```
    public static void main(String args[]) {
        School school = new School("创新大学");
        school.showNews();
    }
}
```

实验 2　检查危险品

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

Goods.java

```
public class Goods {
    boolean isDanger;
    String name;
    public void setIsDanger(boolean boo) {
        isDanger = boo;
    }
    public boolean isDanger() {
        return isDanger;
    }
    public void setName(String s) {
        name = s;
    }
    public String getName() {
        return name;
    }
}
```

DangerException.java

```
public class DangerException extends Exception {
    String message;
    public DangerException() {
         message = "危险品!";
    }
    public void toShow() {
         System.out.print(message+" ");
    }
}
```

Machine.java

```
public class Goods {
```

```
    boolean isDanger;
    String name;
    public void setIsDanger(boolean boo) {
        isDanger = boo;
    }
    public boolean isDanger() {
```

Check.java

```
public class Check {
    public static void main(String args[ ]) {
        Machine machine = new Machine();
        String name[] ={"苹果","炸药","西服","硫酸","手表","硫磺"};
        Goods [] goods = new Goods[name.length]; //检查 6 件物品
        for(int i= 0;i<name.length;i++) {
            goods[i] = new Goods();
            if(i%2==0) {
                goods[i].setIsDanger(false);
                goods[i].setName(name[i]);
            }
            else {
                goods[i].setIsDanger(true);
                goods[i].setName(name[i]);
            }
        }
        for(int i= 0;i<goods.length;i++) {
          try { machine.checkBag(goods[i]);
                System.out.println(goods[i].getName()+"检查通过");
          }
          catch(DangerException e) {
                【代码 2】 //e 调用 toShow()方法
                System.out.println(goods[i].getName()+"被禁止!");
          }
        }
    }
}
```

实验 3　Lambda 语法糖

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

//MainClass.java

```
interface Area {
```

```
    double computerArea(double r);
}
class Circle{
    double r;
    void setRadius(double r){
        this.r = r;
    }
    void showArea(Area area) {
        double result=area.computerArea(r);
        System.out.println("result="+result);
    }
}
public class MainClass {
    public static void main(String args[]) {
        Area area=new Area() {              //匿名类的实例
                        public double computerArea(double r) {
                            return Math.PI*r*r;
                        }
                    };
        System.out.println(area.computerArea(5));
        area= 【代码 1】     //使用 Lambda 表达式代替匿名类的实例
        System.out.println(area.computerArea(2));
        Circle circle=new Circle();
        circle.setRadius(12.8);
        circle.showArea(new Area() {              //匿名类的实例
                            public double computerArea(double r) {
                                return Math.PI*r*r;
                            }});
        circle.setRadius(100);
        circle.showArea(【代码 2】);//使用 Lambda 表达式代替匿名类的实例
    }
}
```

上机实践 7　面向对象的几个基本原则

实验 1　楼房的窗户

程序模板　请认真阅读并调试模板给出的程序代码，然后完成实验后的练习。

Window.java

```
public abstract class Window {
    double width;
    double height;
    public abstract String getMaterial();
    public void setWidth(double w) {
        width = w;
    }
    public void setHeight(double h) {
        height = h;
    }
    public double getHeight(){
         return height;
    }
    public double getWidth(){
         return width;
    }
}
```

Building.java

```
public class Building {
     int windowNumber = 100;
     double width=109.98;
     double height=156.88;
     Window    [] window;
     Building() {
         window=new Window[windowNumber] ;
     }
     Building(int n) {
         windowNumber = n;
         window=new Window[windowNumber] ;
     }
     public void use(Window [] w) {
```

```
            for(int i=0;i<window.length;i++) {
                boolean boo=
                Math.abs(w[i].getWidth()-width)<=1E-2&&
                Math.abs(w[i].getHeight()-height)<=1E-1;
                if(boo){
                    window[i] = w[i];
                }
            }
        }
        public void showWindow() {
            for(int i=0;i<window.length;i++) {
                if(window[i]!=null){
                    System.out.println("第"+(i+1)+"扇窗户是:"+window[i].getMaterial());
                }
                else {
                    System.out.println("该窗户未安装");
                }
            }
        }
}
```

WoodWindow.java

```
public class WoodWindow extends Window {
    public String getMaterial() {
        return "木制窗户";
    }
}
```

AluminumWindow.java

```
public class AluminumWindow extends Window {
    public String getMaterial() {
        return "铝合金窗户";
    }
}
```

Application.java

```
public class Application{
    public static void main(String args[]){
        Building schoolBuilding;
        int m=7;
        schoolBuilding=new Building(m);
        Window [] w = new Window[m];
        for(int i=0;i<m;i++) {
```

```
                if(i%2==0) {
                    w[i] = new WoodWindow();
                    w[i].setWidth(109.98);
                    w[i].setHeight(156.89);
                }
                else if(i%2==1) {
                    w[i] = new AluminumWindow();
                    w[i].setWidth(109.99);
                    w[i].setHeight(156.87);
                }
            }
            schoolBuilding.use(w);
            schoolBuilding.showWindow();
        }
    }
```

实验 2　搭建流水线

程序模板　请认真阅读并调试模板给出的程序代码，然后完成实验后的练习。

MainClass.java

```
public class SingGame {
   public static void main(String args[]){
        Line line=new Line();
        line.givePersonScore();
   }
}
```

InputScore.java

```
import java.util.Scanner;
public class InputScore {
    DelScore del ;
    InputScore(DelScore del) {
         this.del = del;
    }
    public void inputScore() {
        System.out.println("请输入评委数");
        Scanner read=new Scanner(System.in);
        int count = read.nextInt();
        System.out.println("请输入各个评委的分数");
        double []a = new double[count];
        for(int i=0;i<count;i++) {
```

```
                a[i]=read.nextDouble();
            }
            del.doDelete(a);
        }
    }
```

DelScore.java

```
public class DelScore {
    ComputerAver computer ;
    DelScore(ComputerAver computer) {
        this.computer = computer;
    }
    public void doDelete(double [] a) {
        java.util.Arrays.sort(a);   //数组 a 从小到大排序
        System.out.print("去掉一个最高分:"+a[a.length-1]+"，");
        System.out.print("去掉一个最低分:"+a[0]+"。");
        double b[] =new double[a.length-2];
        for(int i=1;i<a.length-1;i++) { //去掉最高分和最低分
           b[i-1] = a[i];
        }
        computer.giveAver(b);
    }
}
```

ComputerAver.java

```
public class ComputerAver {
    public void giveAver(double [] b) {
        double sum=0;
        for(int i =0;i<b.length;i++) {
            sum = sum+ b[i];
        }
        double aver=sum/b.length;
        System.out.println("选手最后得分"+aver);
    }
}
```

Line.java

```
public class Line {
    InputScore one;
    DelScore two;
    ComputerAver three;
    Line(){
        three=new ComputerAver();
```

```
            two=new DelScore(three);
            one=new InputScore(two);
        }
        public void givePersonScore(){
            one.inputScore();
        }
}
```

上机实践 8 几个重要的设计模式

实验 1　分组策略

程序模板　请认真阅读并调试模板给出的程序代码，然后完成实验后的练习。

Group.java

```
public interface Group {
    void group(int n);
}
```

StrategyOne.java

```
public class StrategyOne implements Group {
    public void group(int n) {
        System.out.printf("\n 将 1-%d 按奇偶数分成两组:",n);
        System.out.printf("\n 偶数组:\n");
        for(int i=1;i<=n;i++){
            if(i%2==0)
              System.out.printf("%4d",i) ;
        }
        System.out.printf("\n 奇数组:\n");
        for(int i=1;i<=n;i++){
            if(i%2==1)
              System.out.printf("%4d",i) ;
        }
    }
}
```

StrategyTwo.java

```
public class StrategyTwo implements Group {
    public void group(int n) {
        System.out.printf("\n 将 1-%d 用 3 求余分成三组:",n);
        System.out.printf("\n 被 3 除尽的组:\n");
        for(int i=1;i<=n;i++){
            if(i%3==0)
              System.out.printf("%4d",i) ;
        }
        System.out.printf("\n 被 3 除余 1 的组:\n");
        for(int i=1;i<=n;i++){
            if(i%3==1)
```

```
                System.out.printf("%4d",i) ;
            }
            System.out.printf("\n 被 3 除余 2 的组:\n");
            for(int i=1;i<=n;i++){
                if(i%3==2)
                  System.out.printf("%4d",i) ;
            }
        }
    }
```

StrategyThree.java

```
    public class StrategyThree implements Group {
        public void group(int n) {
            System.out.printf("\n 将 1-%d 按个位是否是 3,4,5,7 分成两组:",n);
            System.out.printf("\n 个位是 3,4,5 或 7 的组:\n");
            for(int i=1;i<=n;i++){
                if(i%10==3||i%10==4||i%10==5||i%10==7)
                  System.out.printf("%3d",i) ;
            }
            System.out.printf("\n 个位不是 3,4,5,7 的组:\n");
             for(int i=1;i<=n;i++){
                if(!(i%10==3||i%10==4||i%10==5||i%10==7))
                  System.out.printf("%3d",i) ;
            }
        }
    }
```

IntegerGroup.java

```
    public class IntegerGroup {
        Group strategy;
        public void setStrategy(Group    strategy) {
            this.strategy=strategy;
        }
        public void integerDivide(int n){
            if(strategy!=null)
                strategy.group(n);
            else
                System.out.println("没有分组策略可用");
        }
    }
```

Application.java

```
public class Application{
```

```
    public static void main(String args[]){
        IntegerGroup makeGroup=new IntegerGroup();   //上下文对象
        makeGroup.setStrategy(new StrategyOne());
        makeGroup.integerDivide(20);
        makeGroup.setStrategy(new StrategyTwo());
        makeGroup.integerDivide(20);
        makeGroup.setStrategy(new StrategyThree());
        makeGroup.integerDivide(20);
    }
}
```

实验 2　房屋中介

程序模板　请认真阅读并调试模板给出的程序代码，然后完成实验后的练习。

Colleague.java

```
public interface Colleague{   // 中介者模式中的同事（Colleague）
    public void giveMess(String mess);
    public void receiverMess(String mess);
    public void setName(String name);
    public String getName();
}
```

RentHouse.java

```
public class RentHouse implements Colleague{     // 中介者模式中的具体同事（出租者）
    ConcreteMediator mediator;                    //中介者
    String name;
    RentHouse(ConcreteMediator mediator){
        this.mediator=mediator;
    }
    public void setName(String name){
        this.name=name;
    }
    public String getName(){
        return name;
    }
    public void giveMess(String    mess){
        mediator.deliverMess(this,mess);
    }
    public void receiverMess(String mess){
        System.out.println(name+"收到的信息:");
        System.out.println("\t"+mess);
```

```
        }
    }
```

BegRentHouse.java

```
public class BegRentHouse implements Colleague{       // 中介者模式中的具体同事（求租者）
    ConcreteMediator mediator;                         //中介者
    String name;
    BegRentHouse(ConcreteMediator mediator){
        this.mediator=mediator;
    }
    public void setName(String name){
        this.name=name;
    }
    public String getName(){
         return name;
    }
    public void giveMess(String    mess){
         mediator.deliverMess(this,mess);
    }
    public void receiverMess(String mess){
        System.out.println(name+"收到的信息:");
        System.out.println("\t"+mess);
    }
}
```

ConcreteMediator.java

```
public class ConcreteMediator{ // 中介者模式中的具体中介者
    RentHouse [] rentHouse;
    BegRentHouse [] begRentHouse;
    public void registerRentHouse(RentHouse [] rentHouse){
        this.rentHouse=rentHouse;
    }
    public void registerBegRentHouse(BegRentHouse [] begRentHouse){
        this.begRentHouse=begRentHouse;
    }
    public void deliverMess(Colleague colleague,String mess){
        if(colleague instanceof RentHouse){
            for(int i=0;i<begRentHouse.length;i++){
               begRentHouse[i].receiverMess(colleague.getName()+mess);
            }
        }
        else if(colleague instanceof BegRentHouse){
            for(int i=0;i<rentHouse.length;i++){
```

```
                    rentHouse[i].receiverMess(colleague.getName()+mess);
                }
            }
        }
    }
```

Application.java

```
public class Application{     //使用中介者模式中的类的应用程序
    public static void main(String args[]){
        ConcreteMediator mediator=new ConcreteMediator();
        RentHouse rentHouse [] = new RentHouse[2];
        rentHouse[0] = new RentHouse(mediator);
        rentHouse[1] = new RentHouse(mediator);
        rentHouse[0].setName("张三");
        rentHouse[1].setName("李四");
        BegRentHouse begRentHouse [] = new BegRentHouse[1];
        begRentHouse[0] = new BegRentHouse(mediator);
        begRentHouse[0].setName("朱方");
        mediator.registerRentHouse(rentHouse);
        mediator.registerBegRentHouse(begRentHouse);
        rentHouse[0].giveMess("房屋出租：租金是 800 元/月");
        rentHouse[1].giveMess("房屋出租：租金是 900 元/月");
        begRentHouse[0].giveMess("求租房屋：租金不高于 800 元/月");
    }
}
```

实验 3　编写文件的步骤

程序模板　请认真阅读并调试模板给出的程序代码，然后完成实验后的练习。

EditFile.java

```
public abstract class EditFile {   //抽象模板
    public abstract void choiceEditTool();
    public abstract void inputContent();
    public abstract void saveFile();
    public final void editStep() {   //模板方法
        choiceEditTool();
        inputContent();
        saveFile();
    }
}
```

JavaFile.java

```
public class JavaFile extends EditFile {
    public void choiceEditTool() {
        System.out.println("用文本编辑器编写 Java 源文件.");
    }
    public void inputContent(){
        System.out.println("输入的内容是:");
        System.out.println("class E { \n}");
    }
    public void saveFile(){
        System.out.println("文件的名字是某个类的名字,扩展名是 java.");
    }
}
```

WordFile.java

```
public class WordFile extends EditFile {
    public void choiceEditTool() {
        System.out.println("用 Microsoft Word 编写 Word 文件.");
    }
    public void inputContent(){
        System.out.println("输入的内容是:简历内容.");
    }
    public void saveFile(){
        System.out.println("文件的名字是 resume,扩展名是 word.");
    }
}
```

Application.java

```
public class Application{   //使用模板方法模式给出的类
    public static void main(String args[]) {
        EditFile edit=new JavaFile();
        edit.editStep();
        edit=new WordFile();
        edit.editStep();
    }
}
```

上机实践 9　常用实用类

实验 1　检索图书

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

FindMess.java

```
public class FindMess {
    public static void main(String args[]) {
        String mess = "书名:Java 程序设计,出版时间:2011.10.01,"+
                      "出版社:清华大学出版社,价格:29.8  元,页数:389 页";
        if(【代码 1】) { //判断 mess 中是否含有"程序"
            System.out.println("图书信息包含有\"程序\"");
        }
        int index=【代码 2】//mess 调用 indexOf(String s,int start)返回 mess 中第 2 个冒号的位置
        String date = mess.substring(index+1,index+11);
        System.out.println(date);
        int pricePosition=  【代码 3】//mess 调用 indexOf(String s)返回首次出现"价格"的位置
        int endPosition=mess.indexOf("元");
        String priceMess = mess.substring(pricePosition+3,endPosition);
        System.out.println("图书价格:"+priceMess);
        double price=Double.parseDouble(priceMess);
        if(price>=29) {
            System.out.println("图书价格"+price+"大于或等于 29 元");
        }
        else {
            System.out.println("图书价格"+price+"小于 29 元");
        }
        index =  【代码 4】//mess 调用 laseIndexOf(String s,int start)返回最后一个冒号位置
        endPosition=mess.lastIndexOf("页");
        String pageMess = mess.substring(index+1,endPosition);
        int p = Integer.parseInt(pageMess);
        if(p>=360) {
            System.out.println("图书的页数"+p+"大于或等于 360");
        }
        else {
            System.out.println("图书的页数"+p+"小于 360");
        }
    }
}
```

实验 2　购物小票

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

FoundPrice.java

```
import java.util.*;
public class FoundPrice {
    public static void main(String args[]) {
        String s="牛奶:89.8 元，香肠:12.9 元  啤酒:69 元  巧克力:132 元";
        String regex="[^0123456789.]" ; //匹配非数字的正则表达识
        String digitMess=s.replaceAll(regex,"*");
        StringTokenizer fenxi=【代码 1】//创建 fenxi,用*做分隔标记解析 digitMess 中的单词
        int number=【代码 2】        //fenxi 调用 countTokens()方法返回单词数量
        double sum=0;
        while(fenxi.hasMoreTokens()) {
            String str=【代码 3】//fenxi 调用 nextToken()方法返回单词
            System.out.println(str);
            sum=sum+Double.parseDouble(str);
        }
        System.out.println("购物小票中的商品种类："+number+"种");
        System.out.println("购物小票中的价格总额："+sum+"元");
     }
}
```

实验 3　比较日期

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

//CompareDate.java

```
import java.time.*;
import java.util.Scanner;
import java.time.temporal.ChronoUnit;
public class CompareDate {
    public static void main(String args[ ]) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("输入开始的年，月，日 ");
        System.out.println("年月日之间用-，/或.分隔\n 例如：2018-2-12");
        String regex = "[-./]";
        String [] input = scanner.nextLine().split(regex);
        int year = Integer.parseInt(input[0]);
        int month = Integer.parseInt(input[1]);
        int day = Integer.parseInt(input[2]);
```

```
        LocalDate dateStart = null;
        【代码 1】// LocalDate 调用 of 方法，返回年月日分别是 year,,month,day 的 dateSart 对象
        System.out.print("输入结束的年，月，日:");
        input = scanner.nextLine().split(regex);
        year = Integer.parseInt(input[0]);
        month = Integer.parseInt(input[1]);
        day = Integer.parseInt(input[2]);
        LocalDate dateEnd = null;
        【代码 2】// LocalDate 调用 of 方法返回年月日分别是 year,,month,day 的 dateEnd 对象
        long days = 【代码 3】//得到 dateStart 和 dateEnd 相隔的天数
        boolean boo = 【代码 4】//判断 dateEnd 是否在 dateStart 之后
        if(boo)
           System.out.println(dateEnd+"在"+dateStart+"之后");
        System.out.println(dateStart+"和"+dateEnd+"相隔：");
        System.out.println(Math.abs(days)+"天(不足一天的零头按 0 计算)");
    }
}
```

实验 4　处理大整数

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

HandleBigInteger.java

```
import java.math.*;
class BigIntegerExample
{   public static void main(String args[])
    {    BigInteger n1=new BigInteger("9876543219876543219876543 21"),
                    n2=new BigInteger("123456789123456789123456789"),
                    result=null;
         result=【代码 1】//n1 和 n2 做加法运算
         System.out.println("和:"+result.toString());
         result=【代码 2】//n1 和 n2 做减法运算
         System.out.println("差:"+result.toString());
         result=【代码 3】//n1 和 n2 做乘法运算
         System.out.println("积:"+result.toString());
         result=【代码 4】//n1 和 n2 做除法运算
         System.out.println("商:"+result.toString());
         BigInteger m=new BigInteger("1968957"),
                    COUNT=new BigInteger("0"),
                    ONE=new BigInteger("1"),
                    TWO=new BigInteger("2");
        System.out.println(m.toString()+"的因子有:");
```

```
            for(BigInteger i=TWO;i.compareTo(m)<0;i=i.add(ONE))
            {   if((n1.remainder(i).compareTo(BigInteger.ZERO))==0)
                {   COUNT=COUNT.add(ONE);
                    System.out.print("    "+i.toString());
                }
            }
            System.out.println("");
            System.out.println(m.toString()+"一共有"+COUNT.toString()+"个因子");
        }
    }
```

实验 5　替换 IP

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

ReplaceErrorWord.java

```
import java.util.regex.*;
public class ReplaceIP{
    public static void main(String args[ ]) {
        String str = "登录网站: 222.128.89.253";
        Pattern pattern;
        Matcher matcher;
        String regex = "[\\d]{1,3}[.][\\d]{1,3}[.][\\d]{1,3}[.][\\d]{1,3}";
        pattern = 【代码 1】      //使用 regex 初试化模式对象 pattern
        matcher = 【代码 2】      //得到检索 str 的匹配对象 matcher
        String IP="";
        while(matcher.find()) {
            IP= matcher.group();
            System.out.print(matcher.start()+"位置出现:");
            System.out.println(IP);
        }
        System.out.printf("将%s 替换为 202.192.78.56\n",IP);
        String result = matcher.replaceAll("202.192.78.56");
        System.out.println(result);
    }
}
```

上机实践 10　Java Swing 图形用户界面

实验 1　算术测试

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

MainClass.java

```
public class MainClass {
    public static void main(String args[]) {
        ComputerFrame frame;
        frame=new ComputerFrame();
        frame.setTitle("算术测试");
        frame.setBounds(100,100,650,180);
    }
}
```

ComputerFrame.java

```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class ComputerFrame extends JFrame {
    JMenuBar menubar;
    JMenu choiceGrade; //选择级别的菜单
    JMenuItem    grade1,grade2;
    JTextField textOne,textTwo,textResult;
    JButton getProblem,giveAnwser;
    JLabel operatorLabel,message;
    Teacher teacherZhang;
    ComputerFrame() {
        teacherZhang=new Teacher();
        teacherZhang.setMaxInteger(20);
        setLayout(new FlowLayout());
        menubar = new JMenuBar();
        choiceGrade = new JMenu("选择级别");
        grade1 = new JMenuItem("幼儿级别");
        grade2 = new JMenuItem("儿童级别");
        grade1.addActionListener(new ActionListener() {
                                                public void actionPerformed(ActionEvent e) {
                                                    teacherZhang.setMaxInteger(10);
```

```
                                        }
                                    });
        grade2.addActionListener(new ActionListener() {
                                        public void actionPerformed(ActionEvent e) {
                                            teacherZhang.setMaxInteger(50);
                                        }
                                    });
        choiceGrade.add(grade1);
        choiceGrade.add(grade2);
        menubar.add(choiceGrade);
        setJMenuBar(menubar);
        【代码 1】                  //创建 textOne,其可见字符长是 5
        textTwo=new JTextField(5);
        textResult=new JTextField(5);
        operatorLabel=new JLabel("+");
        operatorLabel.setFont(new Font("Arial",Font.BOLD,20));
        message=new JLabel("你还没有回答呢");
        getProblem=new JButton("获取题目");
        giveAnwser=new JButton("确认答案");
        add(getProblem);
        add(textOne);
        add(operatorLabel);
        add(textTwo);
        add(new JLabel("="));
        add(textResult);
        add(giveAnwser);
        add(message);
        textResult.requestFocus();
        textOne.setEditable(false);
        textTwo.setEditable(false);
        getProblem.setActionCommand("getProblem");
        textResult.setActionCommand("answer");
        giveAnwser.setActionCommand("answer");
        teacherZhang.setJTextField(textOne,textTwo,textResult);
        teacherZhang.setJLabel(operatorLabel,message);
        【代码 2】//将 teacherZhang 注册为 getProblem 的 ActionEvent 事件监视器
        【代码 3】//将 teacherZhang 注册为 giveAnwser 的 ActionEvent 事件监视器
        【代码 4】//将 teacherZhang 注册为 textResult 的 ActionEvent 事件监视器
        setVisible(true);
        validate();
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);
    }
}
```

Teacher.java

```
import java.util.Random;
import java.awt.event.*;
import javax.swing.*;
public class Teacher implements ActionListener {
    int numberOne,numberTwo;
    String operator="";
    boolean isRight;
    Random random;   //用于给出随机数
    int maxInteger;   //题目中最大的整数
    JTextField textOne,textTwo,textResult;
    JLabel operatorLabel,message;
    Teacher() {
        random = new Random();
    }
    public void setMaxInteger(int n) {
        maxInteger=n;
    }
    public void actionPerformed(ActionEvent e) {
        String str = e.getActionCommand();
        if(str.equals("getProblem")) {
            numberOne = random.nextInt(maxInteger)+1;//1 至 maxInteger 之间的随机数;
            numberTwo=random.nextInt(maxInteger)+1;
            double d=Math.random(); //  获取(0,1)之间的随机数
            if(d>=0.5)
                operator="+";
            else
               operator="-";
            textOne.setText(""+numberOne);
            textTwo.setText(""+numberTwo);
            operatorLabel.setText(operator);
            message.setText("请回答");
            textResult.setText(null);
        }
        else if(str.equals("answer")) {
            String answer=textResult.getText();
            try{    int result=Integer.parseInt(answer);
                    if(operator.equals("+")){
                       if(result==numberOne+numberTwo)
                           message.setText("你回答正确");
                       else
                          message.setText("你回答错误");
                    }
```

```
                else if(operator.equals("-")){
                    if(result==numberOne-numberTwo)
                        message.setText("你回答正确");
                    else
                        message.setText("你回答错误");
                }
            }
            catch(NumberFormatException ex) {
                message.setText("请输入数字字符");
            }
        }
    }
    public void setJTextField(JTextField ... t) {
        textOne=t[0];
        textTwo=t[1];
        textResult=t[2];
    }
    public void setJLabel(JLabel ...label) {
        operatorLabel=label[0];
        message=label[1];
    }
}
```

实验 2　布局与日历

程序模板　　请按模板要求，将【代码】替换为 Java 程序代码。

// CalendarPanel.java

```
import java.awt.*;
import javax.swing.*;
import java.time.*;
public class CalendarPanel extends JPanel {
    GiveCalendar calendar;
    LocalDate [] dataArrays;
    public LocalDate currentDate;
    String name[]={"日","一","二","三", "四","五","六"};
    public CalendarPanel() {
        calendar = new GiveCalendar();
        currentDate = LocalDate.now();
        dataArrays = calendar.getCalendar(currentDate);
        showCalendar(dataArrays);
```

```
}
public void showCalendar(LocalDate [] dataArrays) {
    removeAll();
    GridLayout grid = new GridLayout(7,7);
    【代码 1】//把当前容器的布局设置为 grid
    JLabel [] titleWeek = new JLabel[7];
    JLabel [] showDay = new JLabel[42];
    for(int i=0;i<7;i++){
        titleWeek[i] = new JLabel(name[i],JLabel.CENTER);
        【代码 2】//将组件 titleWeek[i]添加到当前容器
    }
    for(int i=0;i<42;i++){
         showDay[i] = new JLabel("",JLabel.CENTER);
    }
    for(int k=7,i=0;k<49;k++,i++){
        add(showDay[i]);
    }
    int space = printSpace(dataArrays[0].getDayOfWeek());
    for(int i=0,j=space+i;i<dataArrays.length;i++,j++){
         showDay[j].setText(""+dataArrays[i].getDayOfMonth());
    }
    repaint();
}
public void setNext(){
    currentDate = currentDate.plusMonths(1);
    dataArrays = calendar.getCalendar(currentDate);
    showCalendar(dataArrays);
}
public void setPrevious(){
    currentDate = currentDate.plusMonths(-1);
    dataArrays = calendar.getCalendar(currentDate);
    showCalendar(dataArrays);
}
public    int printSpace(DayOfWeek x) {
    int n = 0;
 switch(x) {
        case SUNDAY:    n=0;
                        break;
        case MONDAY:    n=1;
                        break;
        case TUESDAY: n=2;
                        break;
        case WEDNESDAY:n=3;
```

```
                                    break;
                case THURSDAY: n=4;
                                    break;
                case FRIDAY:     n =5;
                                    break;
                case SATURDAY: n = 6;
                                    break;
            }
            return n;
        }
}
```

// ShowCalendar.java

```
import javax.swing.*;
import java.awt.event.*;
public class ShowCalendar extends JFrame {
    CalendarPanel showCalendar;
    JButton nextMonth;
    JButton previousMonth;
    JLabel showYear,showMonth;
    public ShowCalendar() {
        showCalendar = new CalendarPanel();
        add(showCalendar);
        nextMonth = new JButton("下一个月");
        previousMonth = new JButton("上一个月");
        showYear = new JLabel();
        showMonth = new JLabel();
        JPanel pNorth = new JPanel();
        showYear.setText(""+showCalendar.currentDate.getYear()+"年");
        showMonth.setText(""+showCalendar.currentDate.getMonthValue()+"月");
        pNorth.add(showYear);
        pNorth.add(previousMonth);
        pNorth.add(nextMonth);
        pNorth.add(showMonth);
        【代码 3】//将 pNorth 添加到窗口的 NORTH 区域
        nextMonth.addActionListener((e)->{
            showCalendar.setNext();
            showYear.setText(""+showCalendar.currentDate.getYear()+"年");
            showMonth.setText(""+showCalendar.currentDate.getMonthValue()+"月");
        });
        previousMonth.addActionListener((e)->{
            showCalendar.setPrevious();
            showYear.setText(""+showCalendar.currentDate.getYear()+"年");
```

```
                showMonth.setText(""+showCalendar.currentDate.getMonthValue()+"月");
            });
            setSize(290,260);
            setVisible(true);
            setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
        }
        public static void main(String args[]){
            new ShowCalendar();
        }
    }
```

实验 3　华容道

程序模板　认真阅读、调试模板程序，完成实验后的练习。

MainClass.java

```
public class MainClass {
    public static void main(String args[]) {
        new Hua_Rong_Road();
    }
}
```

Hua_Rong_Road. java

```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;
public class Hua_Rong_Road extends JFrame implements MouseListener,KeyListener,ActionListener {
    Person person[]=new Person[10];
    JButton left,right,above,below;
    JButton restart=new JButton("重新开始");
    public Hua_Rong_Road() {
        init();
        setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
        setBounds(100,100,320,500);
        setVisible(true);
        validate();
    }
    public void init() {
        setLayout(null);
        add(restart);
        restart.setBounds(100,320,120,35);
        restart.addActionListener(this);
        String name[]={"曹操","关羽","张","刘","周","黄","兵","兵","兵","兵"};
```

```
        for(int k=0;k<name.length;k++) {
            person[k]=new Person(k,name[k]);
            person[k].addMouseListener(this);
            person[k].addKeyListener(this);
            add(person[k]);
        }
        person[0].setBounds(104,54,100,100);
        person[1].setBounds(104,154,100,50);
        person[2].setBounds(54, 154,50,100);
        person[3].setBounds(204,154,50,100);
        person[4].setBounds(54, 54, 50,100);
        person[5].setBounds(204, 54, 50,100);
        person[6].setBounds(54,254,50,50);
        person[7].setBounds(204,254,50,50);
        person[8].setBounds(104,204,50,50);
        person[9].setBounds(154,204,50,50);
        person[9].requestFocus();
        left=new JButton();
        right=new JButton();
        above=new JButton();
        below=new JButton();
        add(left);
        add(right);
        add(above);
        add(below);
        left.setBounds(49,49,5,260);
        right.setBounds(254,49,5,260);
        above.setBounds(49,49,210,5);
        below.setBounds(49,304,210,5);
        validate();
    }
    public void keyTyped(KeyEvent e){}
    public void keyReleased(KeyEvent e){}
    public void keyPressed(KeyEvent e) {
       Person man=(Person)e.getSource();
       if(e.getKeyCode()==KeyEvent.VK_DOWN)
            go(man,below);
       if(e.getKeyCode()==KeyEvent.VK_UP)
            go(man,above);
       if(e.getKeyCode()==KeyEvent.VK_LEFT)
            go(man,left);
       if(e.getKeyCode()==KeyEvent.VK_RIGHT)
           go(man,right);
```

```
}
public void mousePressed(MouseEvent e) {
   Person man=(Person)e.getSource();
   int x=-1,y=-1;
   x=e.getX();
   y=e.getY();
   int w=man.getBounds().width;
   int h=man.getBounds().height;
   if(y>h/2)
       go(man,below);
   if(y<h/2)
       go(man,above);
   if(x<w/2)
       go(man,left);
   if(x>w/2)
       go(man,right);
}
public void mouseReleased(MouseEvent e) {}
public void mouseEntered(MouseEvent e)   {}
public void mouseExited(MouseEvent e)    {}
public void mouseClicked(MouseEvent e)   {}
public void go(Person man,JButton direction) {
    boolean move=true;
    Rectangle manRect=man.getBounds();
    int x=man.getBounds().x;
    int y=man.getBounds().y;
    if(direction==below)
        y=y+50;
    else if(direction==above)
        y=y-50;
    else if(direction==left)
        x=x-50;
    else if(direction==right)
        x=x+50;
    manRect.setLocation(x,y);
    Rectangle directionRect=direction.getBounds();
    for(int k=0;k<10;k++) {
         Rectangle personRect=person[k].getBounds();
        if((manRect.intersects(personRect))&&(man.number!=k))
            move=false;
    }
    if(manRect.intersects(directionRect))
            move=false;
```

```
            if(move==true)
                    man.setLocation(x,y);
        }
        public void actionPerformed(ActionEvent e) {
            dispose();
            new Hua_Rong_Road();
        }
    }
```

Person.java

```
    import javax.swing.*;
    import java.awt.*;
    import java.awt.event.*;
    public class Person extends JButton implements FocusListener {
        int number;
        Color c=new Color(255,245,170);
        Font font=new Font("宋体",Font.BOLD,12);
        Person(int number,String s) {
            super(s);
            setBackground(c);
            setFont(font);
            this.number=number;
            c=getBackground();
            addFocusListener(this);
        }
        public void focusGained(FocusEvent e) {
            setBackground(Color.red);
        }
        public void focusLost(FocusEvent e) {
            setBackground(c);
        }
    }
```

上机实践 11　对话框

实验 1　字体对话框

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

FontDialogMainClass.java

```
public class FontDialogMainClass {
    public static void main(String args[]) {
        FrameHaveDialog win=new FrameHaveDialog();
    }
}
```

FontFamilyNames.java

```
import java.awt.GraphicsEnvironment;
public class FontFamilyNames {
    String allFontNames[];
    public String [] getFontName() {
        GraphicsEnvironment ge=GraphicsEnvironment.getLocalGraphicsEnvironment();
        allFontNames=ge.getAvailableFontFamilyNames();
        return allFontNames;
    }
}
```

FontDialog.java

```
import java.awt.event.*;
import java.awt.*;
import javax.swing.*;
public class FontDialog extends JDialog implements ItemListener,ActionListener {
    FontFamilyNames fontFamilyNames;
    int fontSize=38;
    String fontName;
    JComboBox fontNameList,fontSizeList;
    JLabel label;
    Font font;
    JButton yes,cancel;
    static int YES=1,NO=0;
    int state=-1;
    FontDialog(JFrame f) {
        super(f);
```

```
    setTitle("字体对话框");
    font=new Font("宋体",Font.PLAIN,12);
    fontFamilyNames=new FontFamilyNames();
    【代码 1】 //当前对话框调用 setModal(boolean b)设置为有模式
    yes=new JButton("Yes");
    cancel=new JButton("cancel");
    yes.addActionListener(this);
    cancel.addActionListener(this);
    label=new JLabel("hello,奥运",JLabel.CENTER);
    fontNameList=new JComboBox();
    fontSizeList=new JComboBox();
    String name[]=fontFamilyNames.getFontName();
    fontNameList.addItem("字体");
    for(int k=0;k<name.length;k++)
        fontNameList.addItem(name[k]);
    fontSizeList.addItem("大小");
    for(int k=8;k<72;k=k+2)
        fontSizeList.addItem(new Integer(k));
    fontNameList.addItemListener(this);
    fontSizeList.addItemListener(this);
    JPanel pNorth=new JPanel();
    pNorth.add(fontNameList);
    pNorth.add(fontSizeList);
    add(pNorth,BorderLayout.NORTH);
    add(label,BorderLayout.CENTER);
    JPanel pSouth=new JPanel();
    pSouth.add(yes);
    pSouth.add(cancel);
    add(pSouth,BorderLayout.SOUTH);
    setBounds(100,100,280,170);
    setDefaultCloseOperation(DISPOSE_ON_CLOSE);
    validate();
}
public void itemStateChanged(ItemEvent e) {
    if(e.getSource()==fontNameList) {
        fontName=(String)fontNameList.getSelectedItem();
        font=new Font(fontName,Font.PLAIN,fontSize);
    }
    else if(e.getSource()==fontSizeList) {
        Integer m=(Integer)fontSizeList.getSelectedItem();
        fontSize=m.intValue();
        font=new Font(fontName,Font.PLAIN,fontSize);
    }
```

```
            label.setFont(font);
            label.repaint();
            validate();
        }
        public void actionPerformed(ActionEvent e) {
            if(e.getSource()==yes) {
                 state=YES;
                 【代码 2】              //对话框设置为不可见
            }
            else if(e.getSource()==cancel) {
                state=NO;
                【代码 3】              //对话框设置为不可见
            }
        }
        public int getState() {
            return state;
        }
        public Font getFont() {
            return font;
        }
    }
```

FrameHaveDialog.java

```
    import java.awt.event.*;
    import java.awt.*;
    import javax.swing.*;
    public class FrameHaveDialog extends JFrame implements ActionListener {
        JTextArea text;
        JButton buttonFont;
        FrameHaveDialog() {
            buttonFont=new JButton("设置字体");
            text=new JTextArea("Java 2 实用教程（第四版）");
            buttonFont.addActionListener(this);
            add(buttonFont,BorderLayout.NORTH);
            add(text);
            setBounds(60,60,300,300);
            setVisible(true);
            validate();
            setDefaultCloseOperation(DISPOSE_ON_CLOSE);
        }
        public void actionPerformed(ActionEvent e) {
            if(e.getSource()==buttonFont) {
                FontDialog dialog=new FontDialog(this);
```

```
                dialog.setVisible(true);
                if(dialog.getState()==FontDialog.YES) {
                    text.setFont(dialog.getFont());
                    text.repaint();
                }
                if(dialog.getState()==FontDialog.NO) {
                    text.repaint();
                }
            }
        }
    }
```

实验 2　计算平方根

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

InputNumber.java

```
import javax.swing.*;
public class InputNumber {
    public static void main(String args[]) {
        double result=0;
        boolean inputComplete=false;
        while(inputComplete==false) {
            String str=【代码 1】 //弹出输入对话框
            try {
                result = Double.parseDouble(str);
                if(result>=0)
                   inputComplete = true;
            }
            catch(NumberFormatException exp) {
                【代码 2】 //弹出消息对话框
                inputComplete = false;
            }
        }
        double sqrtRoot = Math.sqrt(result);
        System.out.println(result+"平方根:"+sqrtRoot);
    }
}
```

上机实践 12　输入输出流

实验 1　举重成绩单

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

AnalysisResult.java

```
import java.io.*;
import java.util.*;
public class AnalysisResult {
    public static void main(String args[]) {
        File fRead = new File("score.txt");
        File fWrite = new File("socreAnalysis.txt");
        try{    Writer out =  【代码 1】//以尾加方式创建指向文件 fWrite 的 out 流
                BufferedWriter bufferWrite =  【代码 2】//创建指向 out 的 bufferWrite 流
                Reader in =  【代码 3】//创建指向文件 fRead 的 in 流
                BufferedReader bufferRead =【代码 4】//创建指向 in 的 bufferRead 流
                String str = null;
                while((str=bufferRead.readLine())!=null) {
                    double totalScore=Fenxi.getTotalScore(str);
                    str = str+"总成绩:"+totalScore;
                    System.out.println(str);
                    bufferWrite.write(str);
                    bufferWrite.newLine();
                }
                bufferRead.close();
                bufferWrite.close();
        }
        catch(IOException e) {
              System.out.println(e.toString());
        }
    }
}
```

Fenxi.java

```
import java.util.*;
public class Fenxi {
    public static double getTotalScore(String s) {
        String regex="[^0123456789.]" ; //匹配非数字的正则表达识
        String digitMess=s.replaceAll(regex,"*");
```

```
            StringTokenizer fenxi = new StringTokenizer(digitMess,"*");
            double totalScore=0;
            while(fenxi.hasMoreTokens()){
                double score = Double.parseDouble(fenxi.nextToken());
                totalScore = totalScore+score;
            }
            return totalScore;
        }
    }
```

实验 2　统计英文单词

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

WordStatistic.java

```
    import java.io.*;
    import java.util.*;
    public class WordStatistic {
        Vector<String> allWord,noSameWord;
        File file = new File("english.txt");
        Scanner sc = null;
        String regex;
        WordStatistic() {
            allWord = new Vector<String>();
            noSameWord = new Vector<String>();
            //regex 是由空格、数字和符号(!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~)组成的正则表达式
            regex= "[\\s\\d\\p{Punct}]+";
            try{    sc =  【代码 1】  //创建指向 file 的 sc
                【代码 2】//sc 调用 useDelimiter(String regex)方法,向参数传递 regex
            }
            catch(IOException exp) {
                System.out.println(exp.toString());
            }
        }
        void setFileName(String name) {
            file = new File(name);
            try{    sc = new Scanner(file);
                sc.useDelimiter(regex);
            }
            catch(IOException exp) {
                System.out.println(exp.toString());
            }
```

```
    }
    public void wordStatistic() {
        try{     while(sc.hasNext()){
                    String word = sc.next();
                    allWord.add(word);
                    if(!noSameWord.contains(word))
                        noSameWord.add(word);
                }
        }
        catch(Exception e){}
     }
   public Vector<String> getAllWord() {
        return allWord;
   }
   public Vector<String> getNoSameWord() {
       return noSameWord;
   }
}
```

OutputWordMess.java

```
import java.util.*;
public class OutputWordMess{
    public static void main(String args[]) {
        Vector<String> allWord,noSameWord;
        WordStatistic statistic =new WordStatistic();
        statistic.setFileName("hello.txt");
        【代码 3】 //statistic 调用 wordStatistic()方法
        allWord=statistic.getAllWord();
        noSameWord=statistic.getNoSameWord();
        System.out.println("共有"+allWord.size()+"个英文单词");
        System.out.println("有"+noSameWord.size()+"个互不相同英文单词");
        System.out.println("按出现频率排列:");
        int count[]=new int[noSameWord.size()];
        for(int i=0;i<noSameWord.size();i++) {
              String s1 = noSameWord.elementAt(i);
                for(int j=0;j<allWord.size();j++) {
                    String s2=allWord.elementAt(j);
                    if(s1.equals(s2))
                        count[i]++;
                }
        }
        for(int m=0;m<noSameWord.size();m++) {
            for(int n=m+1;n<noSameWord.size();n++) {
```

```
                if(count[n]>count[m]) {
                    String temp=noSameWord.elementAt(m);
                     noSameWord.setElementAt(noSameWord.elementAt(n),m);
                     noSameWord.setElementAt(temp,n);
                     int t=count[m];
                     count[m]=count[n];
                     count[n]=t;
                }
            }
        }
        for(int m=0;m<noSameWord.size();m++) {
            double frequency=(1.0*count[m])/allWord.size();
            System.out.printf("%s:%-7.3f",noSameWord.elementAt(m),frequency);
        }
    }
}
```

实验 3　密码流

程序模板　请上机调试下列模板。

PassWord.java

```
import java.io.*;
public class PassWord {
    public static void main(String args[]) {
        boolean success=false;
        int count=0;
        Console cons;
        char[] passwd;
        cons = System.console();
        while(true) {
            System.out.print("输入密码:");
            passwd=cons.readPassword();
            count++;
            String password=new String(passwd);
            if (password.equals("tiger123")) {
                success=true;
                 System.out.println("您第"+count+"次输入的密码正确!");
                break;
            }
            else {
```

```
                System.out.println("您第"+count+"次输入的密码"+password+"不正确");
            }
            if(count==3) {
                System.out.println("您"+count+"次输入的密码都不正确");
                System.exit(0);
            }
        }
        if(success) {
            File file=new File("score.txt");
            try {
                FileReader inOne=new FileReader(file);
                BufferedReader inTwo= new BufferedReader(inOne);
                String s=null;
                while((s=inTwo.readLine())!=null) {
                    System.out.println(s);
                }
                inOne.close();
                inTwo.close();
            }
            catch(IOException exp){}
        }
    }
}
```

上机实践 13 泛型与集合框架

实验 1　按身高排序

程序模板　阅读下列模板并上机调试，完成实验后的练习。

Student.java

```
public class Student implements Comparable<Student> {
    int height=0;
    String name;
    Student(String n,int h) {
        name=n;
        height = h;

    }
    public int compareTo(Student b) { // 两个 Student 对象相等当且仅当二者的 height 值相等
       return (this.height-b.height);
    }
}
```

FindStudent.java

```
import java.util.*;
public class FindStudent {
     public static void main(String args[ ]) {
         List<Student> list = new LinkedList<Student>();
         list.add(new Student("张三",188));
         list.add(new Student("李四",178));
         list.add(new Student("周五",198));
         Iterator<Student> iter=list.iterator();
         System.out.println("排序前,链表中的数据");
         while(iter.hasNext()){
             Student stu=iter.next();
             System.out.println(stu.name+ "身高:"+stu.height);
         }
         Collections.sort(list);
         System.out.println("排序后,链表中的数据");
         iter=list.iterator();
```

```
            while(iter.hasNext()){
                Student stu=iter.next();
                System.out.println(stu.name+ "身高:"+stu.height);
            }
            Student zhaoLin = new Student("zhao xiao lin",178);
            int index = Collections.binarySearch(list,zhaoLin,null);
            if(index>=0) {
                  System.out.println(zhaoLin.name+"和链表中"+list.get(index).name+"身高相同");
            }
        }
    }
```

实验 2　电话簿

程序模板 阅读下列模板并上机调试，完成实验后的练习。

```
// WindowPhone.java

import java.awt.*;
import javax.swing.*;
public class WindowPhone extends JFrame {
    JTextField inputText;
    JButton enter;
    JTextArea showText;
    HandleQuery query;                    //监视器
    WindowPhone() {
        setLayout(new FlowLayout());
        inputText=new JTextField(10);
        enter = new JButton("查询");
        showText=new JTextArea(8,36);
        add(new JLabel("姓名中包含:"));
        add(inputText);
        add(enter);
        add(new JScrollPane(showText));
        query=new HandleQuery();
        query.setView(this);
        enter.addActionListener(query);
        inputText.addActionListener(query);
        setBounds(100,100,460,380);
        setVisible(true);
        setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
    }
```

```
    public static void main(String args[]) {
        WindowPhone win=new WindowPhone();
        win.setTitle("电话簿");
    }
}
```

// HandleQuery.java

```
import java.awt.event.*;
import java.util.*;
import java.io.File;
public class HandleQuery implements ActionListener {
    WindowPhone view;
    HashMap<String,String> hashtable;
    File file=new File("phone.txt");
    Scanner sc=null;
    HandleQuery() {
        hashtable=new HashMap<String,String>();
        try{   sc=new Scanner(file);
               sc.useDelimiter("[#]+");
               while(sc.hasNext()){
                   String name=sc.next();
                   String phoneMess=sc.next();
                   hashtable.put(name,phoneMess);
               }
        }
        catch(Exception e){}
    }
    public void setView(WindowPhone view) {
        this.view=view;
    }
    public void actionPerformed(ActionEvent e) {
        String name=view.inputText.getText().trim();
        Set<String> keySet = hashtable.keySet(); //得到 hashtable 中的全部 Key
        Iterator<String> iter = keySet.iterator();
        while(iter.hasNext()) {
            String nameKey = iter.next();
            if(nameKey.contains(name)){
                String phoneMess=hashtable.get(nameKey);
                view.showText.append(nameKey+":\n"+phoneMess+"\n");
            }
```

```
        }
    }
}
```

实验 3　演出节目单

程序模板　认真阅读、调试模板程序，完成实验后的练习。

//Perform.java

```
public class Perform {    //主类
    public static void main(String args[]){
        new ShowFrame();
    }
}
```

//Program.java

```
import java.time.LocalDateTime;
public class Program implements Comparable<Program> {
    LocalDateTime time=null;
    String name;
    Program(String name,LocalDateTime time) {
        this.name = name;
        this.time = time;
    }
    public int compareTo(Program b) { // 确定 Program 对象之间的大小关系
        return time.compareTo(b.getLocalDateTime());
    }
    public String getName() {
        return name;
    }
    public LocalDateTime getLocalDateTime() {
         return time;
    }
}
```

//ShowFrame.java

```
import java.awt.*;
import java.awt.event.*;
import java.util.*;
import javax.swing.*;
import java.time.LocalDateTime;
public class ShowFrame extends JFrame implements ActionListener {
     JTextArea showArea;
```

```
JTextField inputName,inputTime;
JButton button;
TreeSet<Program> treeSet;
ShowFrame() {
    treeSet= new TreeSet<Program>();
    showArea=new JTextArea();
    showArea.setFont(new Font("",Font.BOLD,20));
    inputName=new JTextField(12);
    inputTime=new JTextField(20);
    button=new JButton("确定");
    button.addActionListener(this);
    JPanel pNorth=new JPanel();
    pNorth.add(new JLabel("节目名称:"));
    pNorth.add(inputName);
    pNorth.add(new JLabel("时间(年-月-日/时:分:秒)"));
    pNorth.add(inputTime);
    pNorth.add(button);
    add(pNorth,BorderLayout.NORTH);
    add(new JScrollPane(showArea),BorderLayout.CENTER);
    setSize(620,320);
    setVisible(true);
    setDefaultCloseOperation(DISPOSE_ON_CLOSE);
    validate();
}
public void actionPerformed(ActionEvent e) {
    String name=inputName.getText();
    String timeStr=inputTime.getText();
    StringTokenizer jiexi = new StringTokenizer(timeStr,"-/: ");
    int year=Integer.parseInt(jiexi.nextToken());
    int month=Integer.parseInt(jiexi.nextToken());
    int day=Integer.parseInt(jiexi.nextToken());
    int hour=Integer.parseInt(jiexi.nextToken());
    int minute=Integer.parseInt(jiexi.nextToken());
    int second=Integer.parseInt(jiexi.nextToken());
    LocalDateTime time = LocalDateTime.of(year,month,day,hour,minute,second);
    Program program = new Program(name,time);
    treeSet.add(program);
    show(treeSet);
}
```

```
    public void show(TreeSet tree) {
        showArea.setText(null);
        Iterator<Program> te= treeSet.iterator();
        while(te.hasNext())    {
            Program pro= te.next();
            String pattern = "%tY-%<tm-%<td/%<tT";
            String strTime = String.format(pattern,pro.getLocalDateTime());
            showArea.append(pro.getName()+"(演出时间):\n"+strTime+"\n");
        }
    }
}
```

上机实践 14　JDBC 数据库操作

实验 1　抽取样本

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

//RandomGetRecord.java

```
import java.util.Vector;
import java.util.Random;
public class GetRandomNumber {
    public static int [] getRandomNumber(int max,int amount){
        Vector<Integer> vector = new Vector<Integer>();
        for(int i=1;i<=max;i++){
            vector.add(i);
        }
        int result[] = new int[amount];
        while(amount>0){
            int index = new Random().nextInt(vector.size());
            int m= vector.elementAt(index);
            vector.removeElementAt(index);
            result[amount-1] = m;
            amount--;
        }
        return result;
    }
}
```

//ComputerAverPrice.java

```
import java.sql.*;
public class ComputerAverPrice {
    public static void main(String args[]) {
        Connection con=null;
        Statement sql;
        ResultSet rs;
        try{
            【代码 1】//加载 Access 数据库连接器
        }
        catch(Exception e){ }
        try{
```

```
            con = DriverManager.getConnection("jdbc:Access://Book.accdb","","");
        }
        catch(SQLException e){
            System.out.println(e);
        }
        try{
            sql=con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE,
                                    ResultSet.CONCUR_READ_ONLY);
            rs =【代码 2】 //sql 调用.executeQuery 方法查询 bookList 表中的全部记录
            rs.last();
            int max = rs.getRow();
            System.out.println("表共有"+max+"条记录,随机抽取 10 条记录：");
            int [] a =GetRandomNumber.getRandomNumber(max,10);
            float sum = 0;
            for(int i:a){
                【代码 3】//将 rs 的游标游标移到第 i 行
                float price = rs.getFloat(3);
                sum = sum+price;
            }
            con.close();
            System.out.println("平均价格:"+sum/a.length);
        }
        catch(SQLException e) { }
    }
}
```

实验 2　用户转账

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

//TurnMoney.java

```
import java.sql.*;
public class TurnMoney {
    public static void main(String args[]){
        Connection con = null;
        Statement sql;
        ResultSet rs;
        try {【代码 1】 //加载数据库连接器
        }
        catch(ClassNotFoundException e){
            System.out.println(""+e);
        }
```

```
        try{ double n = 100;
             con =  【代码 2】//连接数据库
             【代码 3】关闭自动提交模式
             sql = con.createStatement();
             rs = sql.executeQuery("SELECT * FROM card1 WHERE number='zhangsan'");
             rs.next();
             double amountOne = rs.getDouble("amount");
             System.out.println("转账操作之前 zhangsan 的钱款数额:"+amountOne);
             rs = sql.executeQuery("SELECT * FROM card2 WHERE number='xidanShop'");
             rs.next();
             double amountTwo = rs.getDouble("amount");
             System.out.println("转账操作之前 xidanShop 的钱款数额:"+amountTwo);
             amountOne = amountOne-n;
             amountTwo = amountTwo+n;
             sql.executeUpdate(
             "UPDATE card1 SET amount ="+amountOne+" WHERE number ='zhangsan'");
             sql.executeUpdate(
             "UPDATE card2 SET amount ="+amountTwo+" WHERE number ='xidanShop'");
             con.commit(); //开始事务处理,如果发生异常直接执行 catch 块
             【代码 4】恢复自动提交模式
             rs = sql.executeQuery("SELECT * FROM card1 WHERE number='zhangsan'");
             rs.next();
             amountOne = rs.getDouble("amount");
             System.out.println("转账操作之后 zhangsan 的钱款数额:"+amountOne);
             rs = sql.executeQuery("SELECT * FROM card2 WHERE number='xidanShop'");
             rs.next();
             amountTwo = rs.getDouble("amount");
             System.out.println("转账操作之后 xidanShop 的钱款数额:"+amountTwo);
             con.close();
          }
          catch(SQLException e){
             try{ 【代码 5】撤消事务所做的操作
             }
             catch(SQLException exp){}
             System.out.println(e.toString());
          }
    }
}
```

上机实践 15　多线程

实验 1　汉字输入练习

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

TypeChinese.java

```
public class TypeChinese {
   public static void main(String args[]) {
        System.out.println("输入汉字练习(输入#结束程序)");
        System.out.printf("输入显示的汉字(回车)\n");
        Chinese hanzi;
        hanzi = new Chinese();
        GiveChineseThread giveHanzi;
        InputChineseThread typeHanzi;
        【代码 1】创建线程 giveHanzi
        giveHanzi.setChinese(hanzi);
        giveHanzi.setSleepLength(6000);
        【代码 2】创建线程 typeHanzi
        typeHanzi.setChinese(hanzi);
        giveHanzi.start();
        try{
            Thread.sleep(200);
        }
        catch(Exception exp){}
        typeHanzi.start();
    }
}
```

Chinese.java

```
public class Chinese {
    char c ='\0';
    public void setChinese(char c) {
        this.c = c;
    }
    public char getChinese() {
        return c;
    }
}
```

GiveChineseThread.java

```
public class GiveChineseThread extends Thread {
    Chinese hanzi;
    char startChar =(char)22909,endChar = (char)(startChar+100);
    int sleepLength = 5000;
    public void setChinese(Chinese hanzi) {
       this.hanzi = hanzi;
    }
    public void setSleepLength(int n){
        sleepLength = n;
    }
    public void run() {
        char c = startChar;
        while(true) {
            hanzi.setChinese(c);
            System.out.printf("显示的汉字:%c\n ",hanzi.getChinese());
            try{   【代码 3】//调用 sleep 方法使得线程中断 sleepLength 豪秒
            }
            catch(InterruptedException e){}
            c = (char)(c+1);
            if(c>endChar)
                c = startChar;
         }
    }
}
```

InuptChineseThread.java

```
import java.util.Scanner;
public class InputChineseThread extends Thread {
    Scanner reader;
    Chinese hanzi;
    int score = 0;
    InputChineseThread() {
        reader = new Scanner(System.in);
    }
    public void setChinese(Chinese hanzi) {
        this.hanzi = hanzi;
    }
    public void run() {
        while(true) {
           String str = reader.nextLine();
           char c = str.charAt(0);
           if(c==hanzi.getChinese()) {
               score++;
```

```
                System.out.printf("\t\t 输入对了,目前分数%d\n",score);
            }
            else {
               System.out.printf("\t\t 输入错了,目前分数%d\n",score);
            }
            if(c=='#')
                System.exit(0);
        }
    }
}
```

实验 2　双线程猜数字

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

TwoThreadGuessNumber.java

```
public class TwoThreadGuessNumber {
    public static void main(String args[]) {
        Number number=new Number();
        number.giveNumberThread.start();
        number.guessNumberThread.start();
    }
}
```

Number.java

```
public class Number implements Runnable {
    final int SMALLER=-1,LARGER=1,SUCCESS=8;
    int realNumber,guessNumber,min=0,max=100,message=SMALLER;
    boolean pleaseGuess=false,isGiveNumber=false;
    Thread giveNumberThread,guessNumberThread;
    Number() {
    【代码 1】创建 giveNumberThread,当前 Number 类的实例是 giveNumberThread 的目标对象
    【代码 2】创建 guessNumberThread,当前 Number 类的实例是 guessNumberThread 的目标对象
    }
    public void run() {
        for(int count=1;true;count++) {
            setMessage(count);
            if( message==SUCCESS)
                return;
        }
    }
    public synchronized void setMessage(int count) {
```

```
if(Thread.currentThread()==giveNumberThread&&isGiveNumber==false) {
    realNumber=(int)(Math.random()*100)+1;
    System.out.println("随机给你一个 1 至 100 之间的数，猜猜是多少？");
    isGiveNumber=true;
    pleaseGuess=true;
}
if(Thread.currentThread()==giveNumberThread) {
    while(pleaseGuess==true)
        try   { wait();   //让出 CPU 使用权，让另一个线程开始猜数
        }
        catch(InterruptedException e){}
        if(realNumber>guessNumber)   { //结束等待后，根据另一个线程的猜测给出提示
            message=SMALLER;
            System.out.println("你猜小了");
        }
        else if(realNumber<guessNumber) {
            message=LARGER;
            System.out.println("你猜大了");
        }
        else {
            message=SUCCESS;
            System.out.println("恭喜，你猜对了");
        }
        pleaseGuess=true;
    }
if(Thread.currentThread()==guessNumberThread&&isGiveNumber==true) {
        while(pleaseGuess==false)
            try { wait();   //让出 CPU 使用权，让另一个线程给出提示
            }
            catch(InterruptedException e){}
            if(message==SMALLER) {
                min=guessNumber;
                guessNumber=(min+max)/2;
                System.out.println("我第"+count+"次猜这个数是:"+guessNumber);
            }
            else if(message==LARGER) {
                max=guessNumber;
                guessNumber=(min+max)/2;
                System.out.println("我第"+count+"次猜这个数是:"+guessNumber);
            }
            pleaseGuess=false;
}
notifyAll();
```

```
    }
}
```

实验 3　月亮围绕地球

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

MainClass.java

```
import javax.swing.*;
public class MainClass {
        public static void main(String args[]) {
        Sky sky= new Sky();
        JFrame frame = new JFrame();
        frame.add(sky);
        frame.setSize(500,500);
        frame.setVisible(true);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.getContentPane().setBackground(java.awt.Color.white);
      }
}
```

Earth.java

```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;
public class Earth extends JLabel implements ActionListener {
    JLabel moon;   //显示月亮之外观
    Timer timer;
    double pointX[]=new double[360],
           pointY[]=new double[360];
    int w=200,h=200,i=0;
    Earth() {
      setLayout(new FlowLayout());
      setPreferredSize(new Dimension(w,h));
      【代码 1 】 //创建 timer,振铃间隔是 20 毫秒当前 Earth 对象为其监视器
      setIcon(new ImageIcon("earth.jpg"));
      setHorizontalAlignment(SwingConstants.CENTER);
      moon=new JLabel(new ImageIcon("moon.jpg"),SwingConstants.CENTER);
      add(moon);
      moon.setPreferredSize(new Dimension(60,60));
      pointX[0]=0;
      pointY[0]=h/2;
```

```
        double angle=1*Math.PI/180;     //刻度为 1 度
        for(int i=0;i<359;i++) {          //计算出数组中各个元素的值
            pointX[i+1]=pointX[i]*Math.cos(angle)-Math.sin(angle)*pointY[i];
            pointY[i+1]=pointY[i]*Math.cos(angle)+pointX[i]*Math.sin(angle);
        }
        for(int i=0;i<360;i++) {
            pointX[i]=0.8*pointX[i]+w/2;       //坐标缩放、平移
            pointY[i]=0.8*pointY[i]+h/2;
        }
        timer.start();
    }
    public void actionPerformed(ActionEvent e) {
        i=(i+1)%360;
        moon.setLocation((int)pointX[i]-30,(int)pointY[i]-30);
    }
}
```

Sky.java

```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;
public class Sky extends JLabel implements ActionListener {
    Earth earth;
    Timer timer;
    double pointX[]=new double[360],
           pointY[]=new double[360];
    int w=400,h=400,i=0;
    Sky() {
        setLayout(new FlowLayout());
        【代码 2】//创建 timer,振铃间隔是 100 毫秒当前 Sky 对象为其监视器
        setPreferredSize(new Dimension(w,h));
        earth = new Earth();
        add(earth);
        earth.setPreferredSize(new Dimension(200,200));
        pointX[0]=0;
        pointY[0]=h/2;
        double angle=1*Math.PI/180;     //刻度为 1 度
        for(int i=0;i<359;i++) {          //计算出数组中各个元素的值
            pointX[i+1]=pointX[i]*Math.cos(angle)-Math.sin(angle)*pointY[i];
            pointY[i+1]=pointY[i]*Math.cos(angle)+pointX[i]*Math.sin(angle);
        }
        for(int i=0;i<360;i++) {
            pointX[i]=0.5*pointX[i]+w/2;       //坐标缩放、平移
```

```
            pointY[i]=0.5*pointY[i]+h/2;
        }
        timer.start();
    }
    public void actionPerformed(ActionEvent e) {
        i=(i+1)%360;
        earth.setLocation((int)pointX[i]-100,(int)pointY[i]-100);
    }
}
```

上机实践 16　Java 中的网络编程

实验 1　读取服务器端文件

程序模板　请按模板要求，将【代码】替换为 Java 程序代码。

ReadFile.java

```
import java.awt.*;
import java.awt.event.*;
import java.net.*;
import java.io.*;
import javax.swing.*;
public class ReadURLSource {
    public static void main(String args[]) {
        new NetWin();
    }
}
class NetWin extends JFrame implements ActionListener,Runnable {
    JButton button;
    URL url;
    JTextField inputURLText; //输入 URL
    JTextArea area;
    byte b[]=new byte[118];
    Thread thread;
    NetWin() {
        inputURLText=new JTextField(20);
        area=new JTextArea(12,12);
        button=new JButton("确定");
        button.addActionListener(this);
        thread=new Thread(this);
        JPanel p=new JPanel();
        p.add(new JLabel("输入网址:"));
        p.add(inputURLText);
        p.add(button);
        add(area,BorderLayout.CENTER);
        add(p,BorderLayout.NORTH);
        setBounds(60,60,560,300);
        setVisible(true);
        validate();
```

```
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }
    public void actionPerformed(ActionEvent e) {
        if(!(thread.isAlive()))
            thread=new Thread(this);
        try{    thread.start();
        }
        catch(Exception ee) {
                inputURLText.setText("我正在读取"+url);
        }
    }
    public void run() {
        try { int n=-1;
                area.setText(null);
                String name=inputURLText.getText().trim();
                【代码 1】 //使用字符串 name 创建 url 对象
                String hostName =【代码 2】 //url 调用 getHost()
                int urlPortNumber= url.getPort();
                String fileName=url.getFile();
                InputStream in = 【代码 3】 //url 调用方法返回一个输入流
                area.append("\n 主机:"+hostName+"端口:"+urlPortNumber+
                            "包含的文件名字:"+fileName);
                area.append("\n 文件的内容如下:");
                while((n=in.read(b))!=-1) {
                      String s=new String(b,0,n);
                            area.append(s);
                }
        }
        catch(MalformedURLException e1) {
                inputURLText.setText(""+e1);
                return;
        }
        catch(IOException e1) {
              inputURLText.setText(""+e1);
              return;
        }
    }
}
```

实验 2　会结账的服务器

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

客户端模板：ClientItem.java

```
import java.io.*;
import java.net.*;
import java.util.*;
public class ClientItem    {
    public static void main(String args[]) {
        Scanner scanner = new Scanner(System.in);
        Socket clientSocket=null;
        DataInputStream inData=null;
        DataOutputStream outData=null;
        Thread thread ;
        Read read=null;
        try{    clientSocket=new Socket();
                read = new Read();
                thread = new Thread(read);     //负责读取信息的线程
                System.out.print("输入服务器的 IP:");
                String IP = scanner.nextLine();
                System.out.print("输入端口号:");
                int port = scanner.nextInt();
                String enter=scanner.nextLine(); //消耗回车
                if(clientSocket.isConnected()){}
                else{
                   InetAddress    address=InetAddress.getByName(IP);
                   InetSocketAddress socketAddress=new InetSocketAddress(address,port);
                   clientSocket.connect(socketAddress);
                   InputStream in=【代码 1】//clientSocket 调用 getInputStream()返回输入流
                   OutputStream out=【代码 2】//clientSocket 调用 getOutputStream()返回输出流
                   inData =new DataInputStream(in);
                   outData = new DataOutputStream(out);
                   read.setDataInputStream(inData);
                   read.setDataOutputStream(outData);
                   thread.start();   //启动负责读信息的线程
                }
         }
         catch(Exception e) {
                System.out.println("服务器已断开"+e);
         }
    }
}
class Read implements Runnable {
    Scanner scanner = new Scanner(System.in);
    DataInputStream in;
    DataOutputStream out;
```

```
    public void setDataInputStream(DataInputStream in) {
        this.in = in;
    }
    public void setDataOutputStream(DataOutputStream out) {
        this.out = out;
    }
    public void run() {
        System.out.println("输入账单:");
        String content = scanner.nextLine();
        try{    out.writeUTF("账单"+content);
                String str = in.readUTF();
                System.out.println(str);
                str = in.readUTF();
                System.out.println(str);
                str = in.readUTF();
                System.out.println(str);
        }
        catch(Exception e) {}
    }
}
```

服务器端模板：ServerItem.java

```
import java.io.*;
import java.net.*;
import java.util.*;
public class ServerItem {
    public static void main(String args[]) {
        ServerSocket server=null;
        ServerThread thread;
        Socket you=null;
        while(true) {
            try{    server=  【代码 3】//创建在端口 4331 上负责监听的  ServerSocket 对象
            }
            catch(IOException e1) {
                    System.out.println("正在监听");
            }
            try{    System.out.println("正在等待客户");
                    you=  【代码 4】  // server 调用 accept()返回和客户端相连接的 Socket 对象
                    System.out.println("客户的地址:"+you.getInetAddress());
            }
           catch (IOException e) {
                    System.out.println(""+e);
           }
```

```
                if(you!=null) {
                        new ServerThread(you).start();
                }
            }
        }
    }
    class ServerThread extends Thread {
        Socket socket;
        DataInputStream in=null;
        DataOutputStream out=null;
        ServerThread(Socket t) {
            socket=t;
            try    { out=new DataOutputStream(socket.getOutputStream());
                     in=new DataInputStream(socket.getInputStream());
                   }
            catch (IOException e) {}
        }
        public void run() {
            try{
                String item = in.readUTF();
                Scanner scanner = new Scanner(item);
                scanner.useDelimiter("[^0123456789.]+");
                if(item.startsWith("账单")) {
                  double sum=0;
                  while(scanner.hasNext()){
                    try{    double price = scanner.nextDouble();
                            sum = sum+price;
                            System.out.println(price);
                    }
                    catch(InputMismatchException exp){
                            String t = scanner.next();
                    }
                  }
                  out.writeUTF("您的账单:");
                  out.writeUTF(item);
                  out.writeUTF("总额:"+sum+"元");
                }
            }
            catch(Exception exp){}
        }
    }
```

实验 3　读取服务器端的窗口

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

客户端模板：Client.java

```
import java.io.*;
import java.net.*;
import java.util.*;
public class Client   {
    public static void main(String args[]) {
        Scanner scanner = new Scanner(System.in);
        Socket mysocket=null;
        ObjectInputStream inObject=null;
        ObjectOutputStream outObject=null;
        Thread thread ;
        ReadWindow readWindow=null;
        try{   mysocket=new Socket();
               readWindow = new ReadWindow();
               thread = new Thread(readWindow);            //负责读取信息的线程
               System.out.print("输入服务器的 IP:");
               String IP = scanner.nextLine();
               System.out.print("输入端口号:");
               int port = scanner.nextInt();
               if(mysocket.isConnected()){}
               else{
                  InetAddress   address=InetAddress.getByName(IP);
                  InetSocketAddress socketAddress=new InetSocketAddress(address,port);
                  mysocket.connect(socketAddress);
                  InputStream in=【代码 1】   //mysocket 调用 getInputStream()返回输入流
                  OutputStream out=【代码 2】//mysocket 调用 getOutputStream()返回输出流
                  inObject =new ObjectInputStream(in);
                  outObject = new ObjectOutputStream(out);
                  readWindow.setObjectInputStream(inObject);
                  thread.start();   //启动负责读取窗口的线程
               }
        }
        catch(Exception e) {
               System.out.println("服务器已断开"+e);
        }
    }
}
class ReadWindow implements Runnable {
```

```
    ObjectInputStream    in;
    public void setObjectInputStream(ObjectInputStream    in) {
        this.in = in;
    }
    public void run() {
        double result = 0;
        while(true) {
          try{ javax.swing.JFrame window = (javax.swing.JFrame)in.readObject();
                window.setTitle("这是从服务器上读入的窗口");
                window.setVisible(true);
                window.requestFocusInWindow();//requestFocus();
                window.setSize(600,800);

          }
          catch(Exception e) {
                System.out.println("与服务器已断开"+e);
                break;
          }
        }
    }
}
```

服务器端模板：Server.java

```
import java.io.*;
import java.net.*;
import java.util.*;
import java.awt.*;
import javax.swing.*;
public class Server {
    public static void main(String args[]) {
        ServerSocket server=null;
        ServerThread thread;
        Socket you=null;
        while(true) {
            try{    server=  【代码 3】//创建在端口 4331 上负责监听的  ServerSocket 对象
            }
            catch(IOException e1) {
                  System.out.println("正在监听");
            }
            try{    you=    【代码 4】  // server 调用 accept()返回和客户端相连接的 Socket 对象
                   System.out.println("客户的地址:"+you.getInetAddress());
            }
            catch (IOException e) {
```

```
                    System.out.println("正在等待客户");
                }
                if(you!=null) {
                    new ServerThread(you).start();
                }
            }
        }
    }
    class ServerThread extends Thread {
        Socket socket;
        ObjectInputStream in=null;
        ObjectOutputStream out=null;
        JFrame window;
        JTextArea text;
        ServerThread(Socket t) {
            socket=t;
            try   { out=new ObjectOutputStream(socket.getOutputStream());
                    in=new ObjectInputStream(socket.getInputStream());
            }
            catch (IOException e) {}
            window =new JFrame();
            text = new JTextArea();
            for(int i=1;i<=20;i++) {
                text.append("你好,我是服务器上的文本区组件\n");
            }
            text.setBackground(Color.yellow);
            window.add(text);
            window.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        }
        public void run() {
            try{   out.writeObject(window);
            }
            catch (IOException e) {
                System.out.println("客户离开");
            }
        }
    }
```

实验 4　与服务器玩猜数游戏

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

客户端模板：ClientGuess.java

```
import java.io.*;
import java.net.*;
import java.util.*;
public class ClientGuess    {
    public static void main(String args[]) {
        Scanner scanner = new Scanner(System.in);
        Socket mysocket=null;
        DataInputStream inData=null;
        DataOutputStream outData=null;
        Thread thread ;
        ReadNumber readNumber=null;
        try{    mysocket=new Socket();
                readNumber = new ReadNumber();
                thread = new Thread(readNumber);     //负责读取信息的线程
                System.out.print("输入服务器的 IP:");
                String IP = scanner.nextLine();
                System.out.print("输入端口号:");
                int port = scanner.nextInt();
                if(mysocket.isConnected()){}
                else{
                   InetAddress    address=InetAddress.getByName(IP);
                   InetSocketAddress socketAddress=new InetSocketAddress(address,port);
                   mysocket.connect(socketAddress);
                   InputStream in=【代码 1】     //mysocket 调用 getInputStream()返回输入流
                   OutputStream out=【代码 2】//mysocket 调用 getOutputStream()返回输出流
                   inData =new DataInputStream(in);
                   outData = new DataOutputStream(out);
                   readNumber.setDataInputStream(inData);
                   readNumber.setDataOutputStream(outData);
                   thread.start();   //启动负责读取随机数的线程
                }
         }
         catch(Exception e) {
                System.out.println("服务器已断开"+e);
         }
    }
}
class ReadNumber implements Runnable {
    Scanner scanner = new Scanner(System.in);
    DataInputStream in;
    DataOutputStream out;
    public void setDataInputStream(DataInputStream in) {
        this.in = in;
```

```
    }
    public void setDataOutputStream(DataOutputStream out) {
        this.out = out;
    }
    public void run() {
        try {
            out.writeUTF("Y");
            while(true) {
                String str = in.readUTF();
                System.out.println(str);
                if(!str.startsWith("询问")) {
                    if(str.startsWith("猜对了"))
                        continue;
                    System.out.print("好的，我输入猜测:");
                    int myGuess = scanner.nextInt();
                    String enter = scanner.nextLine(); //消耗多余的回车
                    out.writeInt(myGuess);
                }
                else {
                   System.out.print("好的，我输入 Y 或 N:");
                   String myAnswer = scanner.nextLine();
                   out.writeUTF(myAnswer);
                }
            }
        }
        catch(Exception e) {
             System.out.println("与服务器已断开"+e);
             return;
        }
    }
}
```

服务器端模板：ServerNumber.java

```
import java.io.*;
import java.net.*;
import java.util.*;
public class ServerNumber {
    public static void main(String args[]) {
        ServerSocket server=null;
        ServerThread thread;
        Socket you=null;
        while(true) {
            try{   server=  【代码 3】//创建在端口 4331 上负责监听的 ServerSocket 对象
```

```
                }
                catch(IOException e1) {
                    System.out.println("正在监听");
                }
                try{   you=   【代码 4】 // server 调用 accept()返回和客户端相连接的 Socket 对象
                        System.out.println("客户的地址:"+you.getInetAddress());
                }
                catch (IOException e) {
                        System.out.println("正在等待客户");
                }
                if(you!=null) {
                        new ServerThread(you).start();
                }
            }
        }
    }
    class ServerThread extends Thread {
        Socket socket;
        DataInputStream in=null;
        DataOutputStream out=null;
        ServerThread(Socket t) {
            socket=t;
            try   { out=new DataOutputStream(socket.getOutputStream());
                    in=new DataInputStream(socket.getInputStream());
            }
            catch (IOException e) {}
        }
        public void run() {
            try{
                  while(true) {
                      String str = in.readUTF();
                      boolean boo =str.startsWith("Y")||str.startsWith("y");
                      if(boo) {
                          out.writeUTF("给你一个 1 至 100 之间的随机数,请猜它是多少呀!");
                          Random random=new Random();
                          int realNumber = random.nextInt(100)+1;
                          handleClientGuess(realNumber);
                          out.writeUTF("询问:想继续玩输入 Y，否则输入 N:");
                      }
                      else {
                          return;
                      }
                  }
```

```
            }
            catch(Exception exp){}
        }
        public void handleClientGuess(int realNumber){
            while(true) {
                try{    int clientGuess = in.readInt();
                        System.out.println(clientGuess);
                        if(clientGuess>realNumber)
                            out.writeUTF("猜大了");
                        else if(clientGuess<realNumber)
                            out.writeUTF("猜小了");
                        else if(clientGuess==realNumber) {
                            out.writeUTF("猜对了！ ");
                            break;
                        }
                }
                catch (IOException e) {
                        System.out.println("客户离开");
                        return;
                }
            }
        }
    }
```

实验 5　传输图像

程序模板 请按模板要求，将【代码】替换为 Java 程序代码。

客户端模板：ClientImage.java

```
    import java.net.*;
    import java.awt.*;
    import java.awt.event.*;
    import java.io.*;
    import javax.swing.*;
    class ImageCanvas extends Canvas {
        Image image=null;
        public ImageCanvas() {
            setSize(200,200);
        }
        public void paint(Graphics g) {
            if(image!=null)
               g.drawImage(image,0,0,this);
```

```
    }
    public void setImage(Image image) {
        this.image=image;
    }
}
public class ClientGetImage extends JFrame implements Runnable,ActionListener {
    JButton b=new JButton("获取图像");
    ImageCanvas canvas;
    ClientGetImage() {
        super("I am a client");
        setSize(320,200);
        setVisible(true);
        b.addActionListener(this);
        add(b,BorderLayout.NORTH);
        canvas=new ImageCanvas();
        add(canvas,BorderLayout.CENTER);
        Thread thread=new Thread(this);
        validate();
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        thread.start();
    }
    public void actionPerformed(ActionEvent event) {
        byte b[]="请发图像".trim().getBytes();
        try{   InetAddress address=InetAddress.getByName("127.0.0.1");
               DatagramPacket data=【代码 1】//创建 data，该数据包的目标地址和端口分别是
                                                    //address 和 1234，其中的数据为数组 b 的全部字节
               DatagramSocket mailSend=【代码 2】//创建负责发送数据的 mailSend 对象
               【代码 3】 //mailSend 发送数据 data
             }
        catch(Exception e){}
    }
    public void run() {
        DatagramPacket pack=null;
        DatagramSocket mailReceive=null;
        byte b[]=new byte[8192];
        ByteArrayOutputStream out=new ByteArrayOutputStream();
        try{       pack=new DatagramPacket(b,b.length);
                   mailReceive =【代码 4】//创建在端口 5678 负责收取数据包的 mailReceive 对象
           }
        catch(Exception e){}
        try{     while(true)
                   {   mailReceive.receive(pack);
                       String message=new String(pack.getData(),0,pack.getLength());
```

```
                    if(message.startsWith("end")) {
                        break;
                    }
                    out.write(pack.getData(),0,pack.getLength());
                }
                byte imagebyte[]=out.toByteArray();
                out.close();
                Toolkit tool=getToolkit();
                Image image=tool.createImage(imagebyte);
                canvas.setImage(image);
                canvas.repaint();
                validate();
            }
        catch(IOException e){}
    }
    public static void main(String args[]) {
        new ClientGetImage();
    }
}
```

服务器端模板：Server.Imagejava

```
import java.net.*;
import java.io.*;
public class ServerImage {
    public static void main(String args[]) {
        DatagramPacket pack=null;
        DatagramSocket mailReceive=null;
        ServerThread thread;
        byte b[]=new byte[8192];
        InetAddress address=null;
        pack=new DatagramPacket(b,b.length);
        while(true) {
            try{    mailReceive= new DatagramSocket(1234);
            }
            catch(IOException e1) {
                    System.out.println("正在等待");
            }
            try{    mailReceive.receive(pack);
                    address=pack.getAddress();
                    System.out.println("客户的地址:"+address);
            }
            catch (IOException e) {}
           if(address!=null) {
```

```
                    new ServerThread(address).start();
                }
            }
        }
    }
    class ServerThread extends Thread {
        InetAddress address;
        DataOutputStream out=null;
        DataInputStream    in=null;
        String s=null;
        ServerThread(InetAddress address) {
            this.address=address;
        }
        public void run() {
            FileInputStream in;
            byte b[]=new byte[8192];
            try{    in=new    FileInputStream ("a.jpg");
                    int n=-1;
                    while((n=in.read(b))!=-1) {
                       DatagramPacket data=new DatagramPacket(b,n,address,5678);
                       DatagramSocket mailSend=new DatagramSocket();
                       mailSend.send(data);
                    }
                    in.close();
                    byte end[]="end".getBytes();
                    DatagramPacket data=new DatagramPacket(end,end.length,address,5678);
                    DatagramSocket mailSend=new DatagramSocket();
                    mailSend.send(data);
            }
            catch(Exception e){}
        }
    }
```